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THE OUTCOME AT SPRINGFIELD, MASS.

At an adjourned and final hearing held by the Springfield Board of Aldermen on the evening of July 18th, for the purpose of listening to closing arguments of counsel for and against the granting of an opposition gas franchise for that city, the proceedings were so interesting that the City Fathers noted not the lapse of time. In fact the town clock announced that dread midnight brooded o'er the scene ere the Chairman decided that the session was adjourned. It is no wonder that much interest attached to the proceedings, aside from the practical nature and possible effect of the official verdict subsequently to be rendered, for it is not on every night in the year that the ear of the average alderman is regaled with the tinkling, bell-like notes so easily commanded by that prince of special pleaders and most sparkling of wits—ex-Governor Robinson. We are quite aware that that Honorable gentleman is well entitled to the confidence, esteem and respect of the solid citizens of Massachusetts, and we are further aware that those who follow the profession of the law cannot always pick their company, and it is owing to such difficulty of choice, no doubt, that lawyers are often found pleading for the success of enterprises, which, to say the least, are not especially pregnant with the odor of the rose. Retainers are potent arguments, to which we might add that the smell of the rose does not equally tickle the nostrils of each inhaler—in other words, the retainer usually takes on its moral aspect irrespective of the hand that offers it. Now, we do not mean to say that we think that Mr. C. L. Long, who represented the interests of the remonstrants, is a match for the ex-Governor in the use of those witty, pleasant sentences which so often enthused the latter's political followers, but Mr. Long can quite as readily give tongue to useful facts, and is just as adept in the art of handling evidence as is the ex-Governor when the latter is at his best. We make mention of these things simply to show that the ex-Governor had a little the worst of the cause in the Springfield debate, and that therefore he can console himself for defeat by saying: "I did pretty well, under the circumstances." But we anticipate, as some ancient writers of fiction were wont to say.

Mr. Long, in opening his argument for the remonstrants, introduced a copy of the petition under which some of those confessedly interested in the company now seeking for a franchise in Springfield had managed to delude the municipal authorities of Albany (N. Y.) into giving them a chance to gobble up the old Albany Gas Light Company. The Albany case is now famous in the gas history of the country as the one in which Tony Brady managed to "drive a coach and four" clean through the provisions of a supposed-to-be iron-clad "municipal" contract.

When Counselor Long finished his recapitulation of the Albany contract he added thereto a statement which rather displeased the petitioners, and the statement was simply this: "For the benefit of the city the Springfield Gas Light Company voted yesterday that the price to be charged for gas, beginning with the quarter commencing on the 1st day of October, 1887, shall be at the rate of $1.75 per thousand cubic feet; but consumers whose bills average $150 a quarter shall receive their gas at $1.65 per thousand. The city, for gas used in the public buildings and on the streets, to be charged $1.25 per thousand." He then followed by calling attention to the fact that those most interested in the proposed Equitable Company were in reality strangers who sought

merely to accomplish financial gain, careless as to whether or not that success was secured at the cost of financial ruin to people whose ancestors actually founded and made possible the Springfield of the present. In connection with this we reproduce a line or two from that portion of Mr. Long's argument. He said: "Who are those composing the Springfield Gas Light Company? Look at some of their names—Chapin, Gunn, Brewer, Hallett. Are these men honest? Are they respected in and by the community? Years ago the founders of the Company, having faith in the future of their chosen place of residence, invested their money in a business that was deemed extra hazardous. After their early struggles came success, and this success has attracted the attention of foreigners. It is a question between the ownership of the gas works by citizens or by New York residents, who instead of being gas makers are bond makers." Mr. Long then went on to expose the fallacy of the "Baby Process," both in respect of the claims made regarding the cheapness with which gas could be manufactured by it, and as to its candle power. He asked why it was that the "Baby" had not been allowed complete swing in the works of the New York Equitable branch, if it were such a promising infant. Having noted the operations of the Equitable Company, as carried on at various points throughout the country, Mr. Long concluded his argument by saying the Equitable manipulators simply proposed to worry the old Company until its owners would consent to sell out. Mr. Long was followed by the ex-Governor, who, as before intimated, did the best that he could in view of the tools at his command. Nevertheless, wit is not argument, and flippancy does not amount to much as a converter, in view of which we will not worry our readers in reproducing remarks that, however much they entertained Springfield's Aldermen, constituted poor reasons in support of those who sought to parcel out the property of the local gas company.

The Aldermen took one week to digest the matter thoroughly, and the outcome of their ruminations was made public at the session held July 25th, when it was determined (by a vote of 7 in favor to 1 against) to grant the petitioners "leave to withdraw."

THE EUROPEAN GAS ASSOCIATION MEETINGS.

The Twenty-fourth Annual Meeting of the British Gas Institute, held this year in Glasgow, Scotland, fully redeemed the pleasant anticipations of its members, although the attendance, it appears, was not quite up to the usual mark. That defect may be accounted for, partly at least, by the necessity which required the putting forward of the time for gathering some days subsequent to those prescribed by the rules of the Society. This action was rendered necessary by the date appropriated for holding the Jubilee rejoicings, as was fully explained by our English correspondent in his letter printed in the July 2d issue of the JOURNAL. Mr. Wm. Foulis, C.E., President of the Institute, contributed a most excellent inaugural address, and subsequently directed the proceedings with rare ability and consummate tact. Indeed the reigning officer required to be a finished tactician, for he had to deal with one of those unfortunate personal matters that will occasionally crop out in the midst of the best regulated assemblies. Perhaps Mr. Bray and his friends feel satisfied over the "rumpus" which they created, and perhaps the Institute, as a whole, will have reason to be pleased with the affair when the matter is finally settled. At any rate, it seems to us that, in view of their Glasgow stand, the Brayites will speedily be given a chance to choose between fishing and cutting bait. The papers (10 in number) were up to the usual high standard, although the debates thereon seemed to lack crispness and originality. Good weather favored the members, and the purely social features of the gathering were most successfully carried out. Mr. Chas. Gandon was elected President for the ensuing year; and it was determined to hold the next annual meeting in the city of London.

The Annual Session of the Association of French Gas Managers (held this year in Nancy) was presided over by M. Alavoine, and the sessions were marked by close attention to business. In the competition for prizes offered by the Society for the best papers presented to the Congress, M. Lucien Monnier carried of first honors (500 francs), for his memoir on "The Flow of Gas through Long Pipes." The report of the Committee in charge of the affairs of the Association showed that the total membership consisted of 531 members, divided as follows: 18 honorary, 439 ordinary, and 74 associate. M. Ellissen was chosen to the Presidency for the ensuing year. The last day was devoted to the unvailing of a statue of Phillipe Lebon (it was fittingly erected in the town of Chaumont, Haute Marme, the birthplace of Lebon), whom all true Frenchmen hail as the real discoverer of illuminating gas. This statue resulted from a general subscription initiated some years ago by the Association of French Gas Managers.

[OFFICIAL REPORT.—Concluded from page 39.]

Tenth Annual Meeting of the Western Gas Association.

HELD AT ST. LOUIS, MO., MAY 11, 12 AND 13, 1887.

SECOND DAY—MORNING SESSION.

The President now directed that the

QUESTION-BOX

be opened. The first question drawn asked for information upon—"*Uses for coal tar.*"

Mr. Jenkins—Although I am not the author of that question I would like to have it thoroughly discussed, and am particularly interested in discovering whether or not tar can be advantageously used in the construction of sidewalks or roadways. In our Columbus (Ga.) works we, of course, have plenty of tar, refuse breeze, cinders, etc., and what I want to know is whether we can find an outlet for these materials by entering the list of roadway contractors. I understand that many of the Eastern and Western members of the fraternity have met with considerable success in the line indicated, and the question is of importance to us at Columbus, for we cannot sell our tar.

The President—Do you use lime in your purifiers?

Mr. Jenkins—No.

The President—I fear, then, that you will not be successful. For some 10 or 12 years (when we purified with lime at the Cincinnati works) we used the refuse from our boxes, in conjunction with tar and cinders, for making pavements; but since the oxide has come into fashion I find that the spent material is valueless as a pavement component. It seems to crumble and disintegrate. You want the sulphurous lime; but if you attempt to add enough sulphur to the spent oxide to make the latter as available as refuse lime you have too costly an article.

Mr. Odiorne—I have had some experience at Springfield, Ills., in making such pavements, and find that the tar resulting from Pittsburgh coal is the most satisfactory material for making walks out of. I find that tar and cinders, when mixed up in proper proportions, then carefully laid, and rolled smooth two or three days after being first put down, make very good pavements. When it wears a little rough on the top I pour some fresh coal tar on the face of the walk, brushing the tar on with a coarse broom or other device, then sprinkle it over with coke breeze or sand, which gives me a splendid road that will not crack. We probably have three or four blocks of such roadway around the gas works. In the city we have walks, some of them 400 feet in length, made in the way described, which are without a break to-day, although they have been down three or four years. I use nothing else than common rough cinders—just as they come out. We do not heat either the cinders or the tar. I did have a regular plant consisting of a mixer, grinder, and apparatus for heating the tar, but I have abolished it, and now simply use the raw tar and cinders.

Mr. Jenkins—Do you use anything besides coal tar and cinders?

Mr. Odiorne—As a rule, no. Sometimes I mix in coke breeze, and sometimes chips of stone—in fact anything that will answer the purpose.

Mr. Jenkins—Do you heat the tar?

Mr. Odiorne—No; we use it cold.

Mr. McMillin—Does the pavement become soft in the summer season?

Mr. Odiorne—Very little. It will not stick at all.

Mr. Page—What percentage of tar do you use?

Mr. Odiorne—I think we use about half a gallon of tar to a bushel of the cinders.

Mr. Page—Does the Springfield tar come from coal carbonized by regenerative furnaces?

Mr. Odiorne—No; we use the ordinary, old-fashioned furnace. Our benches are threes, of the old-fashioned kind.

Mr. Lindsley—I have had some experience in Cleveland during a period of 15 years in the manufacture and use of tar pavements, and my experience goes to show that, where raw tar had been used, in warm weather (by warm weather, I mean before it got to be very warm), for a long time the pavement would be "sticky." I have tried a mixture of pitch, as prepared for roofing purposes—about 20 or 25 per cent., as compared with the whole volume of material—and found that to be quite an advantage. In the absence of the material I boiled the tar. I do not know that I could give any precise formula with reference to my plan, and do not know what quantity of moisture I may have evaporated in the boiling process, but I boil it probably 10 or 15 minutes, or sufficiently long to feel convinced that the moisture contained had been pretty nearly forced out. Tar that has been so boiled appears to answer the purpose; but, as said, I found that when crude tar was mixed the pavement was likely to become too soft.

The President—In the suburbs of Cincinnati we sold from our works—until we adopted the iron sponge as a purifying material—all the tar, lime and breeze (worked up in the shape of a paving material) that we could handle, and received a very good price for it. In certain Cincinnati suburban localities you will find a great many tar walks that have been in use for years. They are composed of one-third foul lime, two-thirds breeze or cinders, with just enough tar to hold them together. The action of the lime on the walk eats up and throws off the ammonia. You will find that such a pavement will be very soft at first, yet in two hours after it has been put down a man can walk over it, and after it has been down for a week a wagon can drive over it. It will last for years. In the winter time if you dig up such a pavement you will find no frost under it.

Mr. Howard—I understand that Mr. Sherman, of New Haven, Conn., has had considerable experience in the tar walk business; we would like to hear from him.

Mr. Sherman—Mr. Odiorne having stated my experience exactly, I cannot add anything of interest to what he has said. I have two or three acres of tar concrete walks around my works and in their vicinity. It makes a cheap walk, and is a great success with us. We find no occasion to use lime, in fact we never used it. Having very satisfactory walks about our works, we find it makes very little difference whether the footway is a trifle rough; but where we wish to secure a smooth surface finish we add another top dressing mixture of sand and tar, and obtain as smooth a walk as anyone engaged in the business can get by using lime.

Mr. Jenkins—Do you heat the tar?

Mr. Sherman—No, we do not heat it; we simply mix it up. We screen the cinders as they come from the furnace, using the finer portion for the top, and placing the coarser part on the bottom. We have our entire yard covered with this preparation, and find it to be a great success.

Mr. Knight—I would like to hear from Mr. Chollar, of Topeka, Kas., on this subject. Topeka, perhaps, has more tar walks than any other city in the country.

Mr. Chollar—Personally I have had very little experience with tar walks, but a resident of our city, who has followed up that business for several years, has, I suppose, probably laid 20 miles of sidewalk in Topeka. His plan affords a first rate pavement; but it is not made with crude tar. The foundation consists of the ordinary material used for macadamizing roads—perhaps broken a little smaller—which is covered with a slight coating of raw tar, and finally broken stone—the pitch is boiled and mixed with some proportion of tar, I do not know just how much—then a roller is passed over the mass which is pressed down solidly. Then the surface is covered with the screenings from the broken stone—it is a powdered limestone—when a slight sprinkling of tar is added, and the roller is once more brought into play. Very often when the walks are about ready for use they are brushed over with a swab, and then sprinkled with a pulverized stone that resembles clay. When so finished it is difficult to say whether the walks are of the tar variety, or whether they have been made from Trinidad bitumen. Aside from their looks they give excellent satisfaction as roadways.

Mr. Jenkins—Are these walks always reliable?

Mr. Chollar—Sometimes there is a little doubt about them. While not absolutely certain they have given good satisfaction. The price received by the contractor for walks of the sort described is 12½ cents per square foot.

Mr. King—A few years ago, while on a visit to Springfield, Mr. Odiorne's father made a very good suggestion to me. His theory was that tar walks gave out a great deal sooner because of the evaporation of the lighter oil, and that if we could in some way stop that evaporation we would gain by it. His idea was to cover the surface with a cement, or, when the last course of concrete was put down, to sprinkle it with cement. I thought his theory was right, and subsequently tried it with considerable success. Since that time (in the fall of 1886) I noticed (and here is where the electric light plant comes in again) that when our engineer blew out the flues of his boiler the blown-out stuff collected in a chamber in the rear of the boiler, and it occurred to me to use this refuse dust in walk making. Now, when the tar and concrete bed is ready for rolling we sprinkle the fine ashes over it, the last portion of the concrete being wetted with tar, so as to absorb a great deal of this ash. We then pass the roller over the mass, and the ash coating prevents the roller from adhering to the fresh concrete and tearing it up. Walks thus made appear to be a wonderful success, for those that we put down in the fall have stood through the winter, and are as nice looking as one could desire. In talking with Prof. Douglas about this matter he said that a great many tar walks had been put down in Ann Arbor, but the great trouble was that they did not allow a sufficient depth to be given to the concrete mixture. The Professor says, if you put in a sufficient depth of concrete, roll thoroughly, and as the walks appear to dry out, swab with tar, allowing the same to dry, that tar walks will last for years and give good satisfactien.

Mr. Odiorne—We thoroughly roll our walks, and after grading them very nicely we sift down the coarser part to the bottom, leaving the finer material on the top. We first use a light roller, following that with one weighing about 500 pounds, and finish up with one weighing about 1,000 pounds. To keep the rollers from sticking we smear them with coal oil, and if that plan is followed you might pass them over raw tar without taking up any of the latter.

Mr. Page—I think this question is perhaps one of greater interest to the representatives of gas companies here assembled than is generally considered. The use of coal tar for the purpose of making walks has been carried on for many years in England, and to such an extent that it was impossible to buy tar from the smaller works at prices which the distiller could afford to pay. The distiller of coal tar cannot to-day afford to pay, for ordinary, good, rich tar, over 35 to 40 cents per ton of coal carbonized. Counting 12 gallons to the ton, that would be about 3 cents per gallon, or $1.20 for a barrel of 40 gallons. It is a matter of fact that for many years a large percentage of the smaller gas companies of England have received from $2.50 to $3.50 per barrel. That is, as you see (instead of 35 to 40 cents), 80 cents to $1 per ton of coal carbonized. Put that against the carbonization represented in this room to-day and you see an enormous return. The character of the coal tar, as I stated yesterday, is changing, not only among the larger companies, but among the smaller companies as well, owing to the higher heats which are carried in the present mode of carbonizing coal—in fact, the tar produced in works where regenerative furnaces are used is almost valueless for distillation. Therefore the question arises, "How shall we obtain the proper income from that important residual?" The only way that that can be obtained (and, singularly enough, a way that enhances its value) is by utilizing it for this purpose. The regenerative furnace is doing just precisely what my friend King alluded to. It is putting it into the best condition for making these walks. When you consider the condition of the soil in the Western and Southern countries in its relation to sidewalks, you will note that it is almost impossible to pass over the foot-passenger walks in many towns, simply because, wood had been chosen as the material for making them, and has been unequal to the task. They decay rapidly, and in two or three years' time they are gone. The expense of putting down wooden walks is heavy, whereas the expense for tar walks is light. It would be a great advantage to every gas manager here who is carbonizing 500, 5,000, or 10,000 tons of coal per annum to turn his entire tar product into this direction. Without any question it would bring a return, per ton of coal carbonized, in any town or city, of not less than 75 cents to $1; and at the cost at which coal is being delivered in the Western and Southern sections of the country, you have but to put that in connection with the sale of coke, and with the gradually increasing value of the ammonia product, to see where it leads you. Therefore I would suggest, if the information already advanced is not sufficient, that further information as to proportions, to the mode, and the best appliances, be speedily gathered from those who have spoken upon the subject, in regard to the best way of doing this, in order that every gas manager may begin immediately to lay public walks at so much per square yard. Having inaugurated the system, he will find in a short time, if he does not care to continue the business with its consequent trouble, that someone will take it off his hands and continue on with it. Therefore, without any question, within two or three years every gallon of tar should be used for this purpose, and with the result that I name to you (keeping in view the fact that the value of tar as a distilling product is diminishing), which is the receipt of a return, larger I think than you can gain from the same effort bestowed upon any other given subject.

Mr. Jenkins—May I ask whether you would mix the lime and cinders together before you mix the tar with them?

The President—Yes; stir the lime, then sprinkle it over with cinders, and turn it over two or three times. You want to lay that on a bed of ashes first (if you can), and you will find that it will make a hard pavement.

Mr. Jenkins—I use a little lime I have perhaps a bushel of foul lime every time I change the purifiers, and that I can use very well.

The President—We could not get rid of our foul lime or breeze; but when we put down some of the pavements spoken of a demand for the material was speedily created. To-day, were we in position to make that pavement, we could keep two or three hauling carts busy in transporting it. They have been trying to make pavements out of broken

stone and raw tar, but have not succeeded very well. Roadways of that sort speedily break up.

Mr. Page—One important point I feel that I should mention. The objection to tar walks, in Southern countries particularly, is because of the fact that the black surface attracts the sun and retains the heat, thus making it unpleasant to travel over them. In 1870, in England, I passed over a magnificent driveway—the most attractive driveway that I have ever seen in my life. It was all black and white. The white was in irregular forms. On examining it more closely I found that it was an ordinary tar pavement, made precisely as has been described by Mr. Odiorne, and broken pieces of marble, that were gathered from the marble shops as refuse, had been scattered over the surface, which destroyed the objectionable black. Residents of the Western and Southern sections have, in the vicinity of nearly every town, yellow gravel, which can be used as a finishing stone, in connection with sand. By doing so a harder surface will be secured, and the only important objection that can be urged against tar walks will be removed.

Mr. Egner—The President of a gas company, who was much interested in this pavement business, said to me that he found it an advantage to sprinkle a little salt over them. He said it caused them to become quite hard.

Mr. Lansden—Mr. Jenkins spoke of having a small amount of lime. I have made tar walks laid over a foundation of coal dust. I place the cinders 5 or 7 inches deep, put over that layer a quantity of raw tar, then spread a small layer of lime—say 1 to 1½ inches thick—mix in tar with it, and rake it level on top and roll smooth. It generally takes a day or two to harden; but if made in the summer time it will harden when you run the roller over it. I never saw any cracks in a pavement so prepared. I use raw tar. I think the reason why pavements made out of boiled tar are liable to crack is because the boiling process takes out all the light oils, and there is no elasticity left. Mr. Jenkins might just as well take breeze; in fact, some superintendents do mix breeze in with the tar when they have no lime.

The next query was—

"*What causes the formation of small holes in the tops of some gas-holders, even when the latter are but a few years old?*"

The President—I would very much like to have some gentleman answer that question. I have a holder (it has been in use now for 12 or 13 years), on the southwest corner of which nearly every sheet is pierced right through with a small hole. On top the hole looks like a pinhole, but underneath it seems to be nicked away. It will run back three-quarters of an inch. These holes are always in one corner of the sheet.

Mr. Boardman—Is it on the under sheet?

The President—No; on the upper.

Mr. McMillin—How do you get to that southwest corner, when you go round in a circle?

The President—For the simple reason that the north side of the holder does not present or contain a bad sheet. These defects always appear on the south side of the holder.

Mr. Lansden—It has often seemed to me a singular thing that on the south side of a holder (it is several years old) under my charge there are about 500 small pinholes, while on the north side I do not find any of them.

Mr. Averill—I have had a similar experience, but the holes were in the holder top. I remedied the bother in this way: I scraped the top all over, taking all the tar off, put on a thin coating of mineral paint, followed that with a thick paint mixed in raw oil, and plastered a canvas over it. I painted and sanded the first canvas, then stretched a second canvas layer, and painted over that again. That top is now tight—and it ought to be. It is two years since I tried the scheme described.

Mr. Jenkins—That is, you have a composition roof on the top of your holder.

Mr. Averill—Yes; of mineral paint, canvas, and sand.

Mr. Lansden—Did the holes start from the inside or from the outside?

Mr. Averill—From the inside.

Mr. Lansden—The smallest part of the hole was on the outside?

Mr. Averill—Yes. They were such a bother to me that I thought I would try to stop them effectually.

Mr. Lansden—Was this repairing process conducted under pressure, or was the holder let down?

Mr. Averill—It was conducted under pressure, or while the holder was inflated.

Mr. Jenkins—Could not these holes be accounted for by the workmen dropping little globules of acid on the under side of the holder, and the rust collecting there until it had eaten through?

The President—These holes come almost on the line of the rivets. The hole runs down, and stops at the rivet line.

Mr. Lansden—I have taken sheets that were 30 years old, and found some on which the original black paint used to number the sheet was as good as the day it was put on, while other sheets were not only minus the number in black paint, but looked as if they had had the smallpox. I think it is due to the manufacture of the iron.

Mr. Chollar—The fact that two gentlemen noticed the corrosion of the iron on the south side of the holder would indicate that the heat of the sun had something to do with it.

The President—My holder is surrounded by buildings.

Mr. Chollar—But nevertheless the sun would strike with greater effect on the south side of the holder.

Mr. Boardman—It seems to me the action of the sun would have this effect—that if any chemical action took place, that change would be expedited by chemical heat. Perhaps some of the sheets, during transportation, had been exposed to contact with a spray of salt water.

A motion to take a recess until 2:30 P.M. prevailed at this point.

SECOND DAY—AFTERNOON SESSION.

Upon the termination of the recess the President introduced Mr. T. A. Cosgrove, of Evanston, Ills., who read the following paper on

THE LUNGREN BURNER.

I believe you will agree with me when I say that to-day, more than ever before, the gas interests and gas men are placed in a position identical with that of the old, reliable merchant, hitherto fairly prosperous commercially under a conservative method in conducting his affairs, but now made ostentatiously and regretfully aware that someone has located on the opposite corner, and is announcing to the public, in great flaming letters, aided by a glittering display, that he has a class of merchandise which can be adapted to the same purposes as can that of his neighbor—the pioneer. In fact, the newcomer claims that his wares will give even better results. This comparison is applicable, to-day, to the gas interests and their competitors.

I believe that it is our province to sell gas, and to sell no other agent for illumination, consequently I am not of the opinion that it is necessary for gas companies to conduct an electric plant; but having learned that some of my customers had, through the advent of the electric light, become converts to an intense, powerful light, centrally located, rather than continue with the old method of several less intense points of distribution, I looked about for some means to satisfy them without changing the nature of my business. Fortunately for me, and I believe for those interested in gas works generally, the Lungren lamp made its appearance, in its improved form, about that time. I invested in two lamps, just 13 months since, and placed them in a drug store, the proprietor of which had tried a number of various systems, but was still, although he was at once pleased with the volume of light, dissatisfied. He was skeptical at the beginning as to the merit of the lamp, claiming that he had never yet seen the gas appliance that would not consume more than the manufacturer claimed for it. We then took the state of his meter, and again at the end of 30 days—in the meantime he kept account of the number of hours of burning. The result proved even more satisfactory than I had anticipated, as the quantity of gas consumed for the number of hours of burning tallied exactly with the claims of the Company. It needed no persuasion to sell him the lamps at the price charged by the Company, with an additional reasonable charge for work in hanging. Recently this consumer happened to be at the office to pay his bill for the preceding month, and on referring to the book I noticed that the lamps had been sold him one year before. I asked him if he would like to dispose of them, and he answered that if he could not buy another he would not sell them at five times the price he had paid. Since selling that lamp I have introduced quite a number, and in each instance have sold the lamps outright to the consumers, volunteering to give any little attention that they might need, without making any charge for it. The result, in every instance, was highly satisfactory, both to the consumer and to our Company. Although we have not attempted to rent any lamps, I understand that, in many cities and towns, the rental system has been adopted with marked success. In a conversation with some of the members of the Company, at their office, I was told of Minneapolis, Minn., for instance, where the Gas Company rents the lamps under the name of the "Siemens-Lungren Renting Company," of Minneapolis.

Their rental price, per lamp per month, is $1.00, and they send a man twice a week to each lamp to clean the globes and keep the lamp in perfect condition. This, at the rental price, they can readily afford to do and still leave a very handsome margin of profit; and I have also seen

a copy of a letter from Mr. Rand, Vice-President of the Minneapolis Gas Company, in which he wrote that they will rent at least 500 the first year; that the merchants are pleased with the lamp, its illuminating power and the rental price, and that they have already placed 140 on rental within a space of 60 days. In the city of St. Louis, Mo., a rental company has been formed, composed of gentlemen connected with the gas interests here, and several prominent merchants. The price here is, I believe, similar to that in Minneapolis. The company here has fairly started, but their first victory won over their neighbor on the opposite corner is a notable one. The "Famous Shoe and Clothing Company," a prominent retail concern in St. Louis, occupying a large block near the market space, had an electric plant of their own, the plant having a capacity equal to the supply of 65 arc lights. These have been displaced by 120 Lungren lamps, on the rental plan, and the electric plant is for sale.

I have been informed, by members of the Siemens Lungren Company, that they will have a lamp ready, for outside illumination, this fall, as well as various additional sizes for indoor work.

In view of this effective weapon placed at our disposal, and with the surety of a very fair return on the investment, I believe it to be to the interest of everyone connected with the gas business to urge the introduction of these lamps, and I urge it most heartily and sincerely.

Discussion.

Mr. Cosgrove—In addition to the facts contained in the paper I can say that now I have four consumers who use the Lungren lamp. Prior to receiving the Lungren lamps I could not by any means induce any one of the four to burn gas—they had used kerosene oil for 14 years—so you see I am getting consumers for gas by the aid of the Lungren lamp that I never could get by any other means. I put the lamps up for them, allowed them to have the same for a week, and agreed not to charge them anything either for the lamp or gas if they were not pleased. In each case the lamp remained,

Mr. Gimper—In connection with the Lungren let me say that I have experimented with them. I was very cautious with them at first, for we invested in various other lamps before which proved to be unsatisfactory. I ordered two Lungren lamps to begin with, and their value was such that I ordered 15 more of them. I kept on purchasing them, and now we have 60 in use in our city. A large building under control of the city authorities is now partly lighted by the Lungren lamp. We sent two specimens of the lamp, together with a meter, for trial by the authorities—the latter inclined to the idea that the lamps would consume more gas than the rated quantity. The tests, which were carefully made, showed that the lamps kept within the 12 and 16 cubic foot per hour consumption quantities at which they were respectively rated. We have been able to replace quite a number of incandescent arc lights by means of the Lungren lamps. We rent them at 75 cents each per month; but in order to displace an electric light or lights, if the consumer refuses to pay rent, we let them have the lamp without charge. They are undoubtedly an excellent weapon with which to fight the electric light—at least we so find it; and I have no doubt that all who try them thoroughly, and introduce them properly, will be successful in routing the electric light.

Mr. Harbison—Before this discussion is closed let me say it seems to me, unless the members of this Association generally are already pretty well posted with regard to the merits of the Lungren lamp, that it is a subject well worthy their attention. I do not know of any other means of illumination that can compete with that produced from gas consumed in a Lungren burner, and I also think that the gas consumer, once its usefulness is shown to him, will be satisfied as to its economy. However, I do not agree with Mr. Gimper's way of doing business. He charges one consumer 75 cents per month for the use of the lamp, but makes no charge to another party who refuses to use it if obliged to pay a rental charge. I think that in one case he does an injustice to the consumer, while in the other case he does an injustice to the gas company. It would be better to equalize it and charge only that which would allow a reasonable interest on the investment made by the gas company in the purchase of the lamp, also making a proper allowance for wear and tear and use of the lamp. A rental charge of 75 cents per month would pay for a lamp in 2½ years, and I think that that is too large a dividend for a gas company to get out of a consumer. If the rental charge were put at 25 cents the company would still get a fair return for the money invested in the lamp, while a great many more consumers could afford to use it. Our Hartford doctrine is to treat each consumer alike, no matter what quantity of gas is used per month, and without reference to condition. The poor man who receives $1.50 per day, on which he must support a family of five or six children, ought to get his gas at as low a figure as that paid by the bondholder with his hundred-thousand-a-year income. That is the way we do in our city. Cause as many as you can to buy the lamp, and put it up for them at cost, and then you will reap a benefit from the sale of the gas so consumed; but if you rent the lamp, charge the same rent to everyone—put them all on an equality. Give them all the same quality of gas, and measure your gas to one as you do to another. If you do this you will find that it will not be necessary to put a great deal of your money in electric light plants, or in water gas plants, or in any of the other new-fangled notions constantly paraded before us. Adhere strictly to a legitimate coal gas business, and you will make money enough, at a fair price, on an honestly-invested capital. The Lungren lamp is worthy the careful attention of every gas man, and the greater the number of those lamps that you can introduce in your city the better it will be for the consumer and for yourselves. There is not so much variation in the gas bills of those who use the Lungren lamp as compared with cases where ordinary burners are employed, for, as a rule, in the latter instance a consumer will have from three to six jets in a room, hence the variation; but as one Lungren lamp will give as much light as that emitted from any 6-light chandelier, not only will there be greater uniformity in the bills but less gas is consumed. Some may say that it is a remarkable thing for a gas man to recommend the Lungren lamp (which will burn only 16 feet per hour, whereas a 6-light chandelier will burn 24 feet per hour), yet the success of a gas company does not depend altogether upon the amount of the gas bills of any one man, but rather on the general satisfaction of the whole number of consumers; and if you can so manage your business and so supply your consumers that every man who burns your gas is speaking a good word for you, kerosene lamps will disappear, and those who have not hitherto burned gas will begin to use it. Furnish it at a low price, and strive to increase your consumption in every way, for the greater consumption you have from your plant the cheaper you can afford to furnish the gas, and make just as much money for your stockholders.

Mr. Gimper—I agree with what Mr. Harbison says with regard to that; but we do not own an electric light plant, as he does.

Mr. Harbison—I beg your pardon; we do not own any electric light plant, and have not a dollar in that business.

Mr. Gimper—Then I have been misinformed. Perhaps we at Leavenworth have to deal with a different class of people than those who reside in Hartford.

Mr. Harbison—Yours may not be educated up to our standard yet; but keep on.

A vote of thanks was passed to Mr. Cosgrove.

The President having explained that the Question-Box had been emptied, the discussion turned to the subject of

ENRICHING NATURAL GAS.

Mr. McMillin—I think we should take up the question of the cost of enriching natural gas. The President made a very bold assertion here, and I hope someone may be able to show that he is mistaken about it. I have no testimony to offer myself. Messrs. Denniston and Critchlow, of Pittsburgh, Pa., are here, and as they have had considerable experience in this direction, perhaps they may be induced to enlighten us in regard to a very interesting subject.

The President—We shall be glad to hear from the gentlemen.

Mr. Denniston—I did not come here to speak, but rather to listen, for I knew that I thus could learn by so doing. I thank you, however, for the opportunity to say a word in regard to the topic raised by Mr. McMillin. I recognize the fact that the President, in his address, as well as from papers which have been read by other members here, tell us not only about what they know, but also about some things which they believe, but which they are not positive of. I have no doubt that the President believed what he said about natural gas, and I would have agreed with him three years ago, for at that time I held the same opinion that he does now. When I read, at the Cincinnati, Ohio, meeting of the American Association, my first paper* on natural gas, I asserted that various experiments, entailing considerable expenditure, had been made, but that as yet natural gas had not proved a success; that for the present I did not fear it as an illuminant; and that while it made a good fuel gas I did not believe it was going to come into competition with coal gas. Now you will bear me out, and the report in the AMERICAN GAS LIGHT JOURNAL will also bear me out, that I then said that if natural gas ever did assume the role of a competitor it was the province of coal gas men to take hold of it and make light of it—in both senses of the word; to use it, and make a good light of it. If it could be made available at all, I then claimed that it was the province of the coal gas men to utilize it,

*See JOURNAL, Dec. 2, '85, p. 282.

in lieu of the natural gas men, or those who were introducing it for fuel, and to occupy the field for illumination. That has been my experience. From that time I have been experimenting. As far as I was concerned, after spending some considerable money in the experiments, I failed; but, as I then suggested, some others have succeeded, and when they did succeed I immediately wanted to close in and get a part of the pie. I went to the parties who were successful in manipulating it, and when I found that it was really a success I put it into my own works. My coal gas benches are standing idle to-day. Those who last year attended the Philadelphia meeting of the American Association will remember that the cupolas in my works were not completed. Shortly after that meeting some of the delegates visited my works, and, while the plant was not in real working order, it was sufficiently advanced to show that a high candle power gas could be made from natural gas in the way proposed. I think it was demonstrated to most of them that gas could be so made at a lower cost than if coal gas were made. Since that time that fact has been amply proven; but, as the proof of the pudding is in the eating thereof, so the proof of success of this is that those who have tried it will bear me out in asserting that, like me, they have laid aside their coal gas benches. Their, retorts, stand-pipes, etc., stand cold, and they are making more gas with the small cupola furnace than they could with four benches of threes under the coal gas system. I do not want to occupy too much of your time over this matter, because I am free to say to you that I am personally interested in it. However, I will state that there are four things in its favor. First comes the cheapness of the plant—I have a small works that cost $5,000, in which I make more gas, and at one-half the cost, than I can in a coal gas works that cost me $25,000. The first proposition, then, is the cheapness of the plant. The second is the cheapness with which you can make the gas, because of the cheapness of the material—natural gas and oil (using any merchantable crude oil) and the coke or hard coal. You can make the gas without steam. I do not mean to say that you cannot make water gas, too, for you can; but you can make it with or without steam, as has been proven. Then, in the third place, we have the consideration of the high candle power that you can gain with this same material. I made, up to that time, 16-candle gas, which is the legal standard in our city. To-day, because of cheap natural gas, with an ordinary illuminating power of 8 candles, and the competition of incandescent and arc lights, which run anywhere from 8 candle power up, I have to sell an 18 to 20 candle power gas. Now we make out of this cheap plant, and this cheaply made gas, a better illuminant than was ever used in the East End of Pittsburgh before. One other thing in connection with this plant I should mention, and that is the fact that it requires no expenditure to keep it in repair. Each year, with coal gas works, you have to repair or rebuild retorts, stand-pipes, mouthpieces, benches, etc., while inside of this cupola you have simply firebrick. That is all there is about it. It does not cost $25 to reline it, and it requires relining only once in about two years. That is a fact, as Mr. Egner said the other day—although you may not believe it—for it has been done. When the natural gas has been treated you have a high candle power, non-condensable gas. At Beaver Falls, Pa., where Mr. Critchlow has been running the process for two years, a pipe is exposed (between Beaver Falls and New Brighton) on a bridge which spans the Beaver river, but the drip at the end of that bridge has never yet been pumped. In fact, there is nothing in it to pump. If that were a condensable gas it would show itself right there. So, without occupying any more of your time, I want to say to those who are in the natural gas district—make friends of the natural gas men; for if you do not somebody will get up an opposition company. I am in the same boat with every man who has competition of that kind to deal with. I had it in my own place. I experimented, trying to make use of it. Then I went to them and said, "I am going to be a good customer of yours; sell to me cheaply, and I will use your natural gas for an illuminant. You cannot run it through the same line for both heat and light. If you get pressure enough on for heat, then it is too great for light; if you get it so low that you can use it for an illuminant, then it is too low for heating your furnaces, or even for use in your dwelling houses." They listened to me, and we agreed. I use natural gas in my house and in my office; and they in turn use my gas in their offices. They use mine as an illuminant, and I use theirs for fuel. I take their gas and make an illuminant of it; they furnish me my fuel. I would not be bothered with coal where I could get natural gas for fuel; and they on the other hand would not be bothered with their own gas for an illuminant, although they get it for nothing. Therefore, it is for the interest of parties who are coming in competition with natural gas throughout the Western country, and it is the interest of the natural gas men in your vicinity, that they should sell it to you, and that then you should make such a light of it that they cannot afford to use their own gas for light. You can do it, and you can do it so cheaply that probably you would not believe me were I to tell you how cheaply it can be done. To anyone who wants to make the experiment, or who does not want to take my word for it, let him come to our works, or to any of the works in Western Pennsylvania, in Eastern Ohio, or in Southwestern New York, and see how it is done. If you do not go away satisfied, you are not the coal gas men that I take you to be.

Mr. Watts—How many pounds of anthracite coal, and how many gallons of oil, do you use per thousand feet of gas sold?

Mr. Denniston—I will leave my friend Critchlow, who is the patentee, to give you these items. I can tell you what I did, and you can count it on your fingers, if you wish to. I put in about 2,000 feet of natural gas, which cost me, say, 5 cents per thousand. You can call it 10 cents, or twice as much. Then I used 10 or 12 gallons of crude oil, which cost me 2 cents per gallon. It does not cost that much, in fact; but I am putting it at the highest figure. Neither does it cost that much for natural gas; but I am giving it to you so that you can have some data to go upon. Then I will use, say, 100 pounds of coke or hard coal (we use coke), which will cost about 20 cents.

A Member—Can you use coke or coal?

Mr. Denniston—Yes; but we don't use our own coke. It is not advisable to do so for the reason that you form so much clinker. You must bring it to incandescent heat—not only the coke or coal, but the brick-work above as well—and the natural gas, entering at the bottom and passing up through, comes in contact with the oil, which is fed in as a spray, or comes in with steam carried in through a pipe above. There you have the natural gas, the oil and the coke. That is all there is of expense, except the labor and purification. The first cost of the plant is insignificant, and the cost of your gas is comparatively insignificant. I have not given you the output. I put 6,000 feet of merchantable gas into the holder, averaging about 20-candle power.

A Member—With how much labor?

Mr. Denniston—One man will run two cupolas. It is very difficult, as you know about coal gas, to gauge what you can make gas for by what it costs me. Your location and surroundings, and so many things that enter into the first cost, so change the conditions that you cannot take my statement as a certain indication of what it might cost you. For instance, if you are only running from ten to fifty thousand feet per day it is fair to assume that it will cost you more, proportionately, than this cost me when I am making from 100,000 to 500,000 cubic feet per day. The more you make the cheaper it can be made in proportion. The output is, in part at least, the basis for your cost. If Mr. Fullagar can make gas as cheaply in Cincinnati as I think he can, and as cheap as any coal gas man, then I would like him to come and see what, in a small place, and with nothing like the output that he has, and with none of the modern appliances, in fact with only a small plant that was put in by this Company, what he can do it for. I think he will turn his tune and sing a different song next year. I venture that assertion and I can prove it.

Mr. Scofield—But Mr. Fullagar has no natural gas.

Mr. Denniston—He will have it.

Mr. Howard—What faith have you in the continuous supply of natural gas?

Mr. Denniston—I have faith in it for the reason that for 15 years, to my certain knowledge, the flow from one well has supplied the iron works at Sharpsburgh, across the river from Pittsburgh, and the diminution in the flow from that well does not amount to anything. On the other hand, I should not like to answer for the permanency of the flow where you get it at very shallow depths. Within the city limits there have been wells put down, and a considerable supply of natural gas found, but they have fallen away. They have also fallen away throughout the oil country in Western Pennsylvania, as they have throughout Ohio and Western Virginia. Where some years ago there was sufficient gas to supply engines, none is now found at all, so they have had to come back to the use of coal. Of course, the gas flow is not all alike, anything more than the making of your gas is. If the output is large the cost will be just so much less comparatively. Now suppose you only put out 50,000 feet. You must have a man attend to it. True, he may do it in a few hours; but that same man would make 300,000 feet with the simple additional cost of $1,000 for a cupola. You can put out 300,000 feet at nearly the same cost for labor that you can put out 50,000 feet.

Mr. Boardman—You purify that gas, do you not?

Mr. Denniston—Certainly.

Mr. Boardman—How often do you change your purifiers?

Mr. Denniston—Not very often. There is nothing like the trouble that there is with coal gas. I only use two purifiers. I put in a layer of

sawdust first, and follow that with only a layer of lime. The gas is not very impure; but yet it needs purification. If you use a different enriching material—for instance, if you use naphtha, that will not cause the amount of impurity that crude oil does. I am using the dirtiest, stinkingest oil in the market. You cannot touch it without the smell remaining with you for days; and yet with that I am putting out this 20-candle gas to the extent that I have stated.

Mr. Harbison—What is the price of gas in Pittsburgh?

Mr. Denniston—Two years ago I was selling gas at $2.50. I sold gas first at $3, then at $2.65, then at $2.50, with 20 per cent. off; then at $2, with 20 per cent. off, or $1.60. Since I put in this machine I am selling gas at $1.50, with 10 per cent. off, or $1.35. And I may say to you that I have been offered an electric light plant, which was put up in my place just before I put in this machine, at 20 per cent. below what it cost a year ago. Next December the natural gas plant will have been in operation one year, but I can to-day buy that electric light plant, which took from $8,000 to $10,000 of my receipts from me inside of a year, at less than it cost them a year ago. And that is not a singular instance. There are others. The question was asked yesterday (but I did not like to intrude myself upon you, and hope you will pardon me for mentioning it now) as to how best to beat the electric light. I answer: First, get natural gas; then put up one of the Critchlow-McKay machines, and you are in a position to beat the electric light all to pieces.

Mr. Harbison—When you were selling coal gas what was your lowest price per thousand?

Mr. Denniston—$1.60.

Mr. Harbison—So that your consumers have gained 25 cents per 1,000 feet by your introduction of natural gas?

Mr. Denniston—By the introduction of this process; and I give them better light than they ever got before.

Mr. Harbison—I wanted to bring out how the consumers were receiving a benefit from it.

Mr. Denniston—I will tell you something more than that. The receipts have kept up right along from the time I reduced from $2.65—two and a half years ago. So that to-day, at $1.35, my receipts per month are as good as they were then.

Mr. Watts—Has the town increased in population?

Mr. Denniston—Yes, we are increasing. Like some of our energetic Western towns we have increased in population by importing some from Connecticut, and some from across the "drink." But that increase would not make that difference if we had not what Mr. Harbison calls the good will of the consumers, for if they were not satisfied with this gas they would not use so much of it. They would use the natural gas, which they can get for one-twentieth of what they pay me for this gas. But they won't use that. Mr. Westinghouse, the President of the Philadelphia Natural Gas Company, pays me $100 a quarter for light, and the other officers of that Company are using my light in the East End. I believe the light that I give is as good as the Edison, or any other incandescent light. I do say that you cannot get the same candle power from the present incandescent lights (and I am interested in an incandescent light plant) that you can from gas from this machine, or from any good coal gas.

Mr. Watts—I should think that your consumers would be dissatisfied because of the fact that you are making such a profit out of them.

Mr. Denniston—Mine is a suburban district I am not in the center of the city. I have nearly 40 miles of pipe, and upon that 40 miles (until last year) I had only 1,000 consumers. I think I would be safe in saying that there is not another gas company in the United States, or in Canada, that had so much pipe, so large a plant, and so small a consumption. Of course, the class of consumption is good, when I get to it. They are people who do business in the city, and who live out at the East End. They are a good class of people, who live in a good class of houses, and are good cash customers. But the very best business street—in the central business portion of the East End, between the 19th, 20th and 21st wards—is lighted by incandescent lamps. On the other main streets, where my best consumption is, the houses average from 500 to 700 feet apart. In a building like this hotel, for instance, where there may be half a dozen meters, more gas is probably consumed than I could sell in a mile on one of those streets. The business portion, as I have stated, has been taken during the last year by the electric light.

Mr. Harbison—What is the estimated population of the territory in which your pipes are laid?

Mr. Denniston—I cannot give you that. I know about what the population of the city is.

Mr. Harbison—Have you 25,000 or 30,000 people.

Mr. Denniston—There is that number in my territory. My district extends from the Monongahela, on the south, to the Allegheny, on the north; and from the old city line, as we know it, of Pittsburgh, on the east, out to Wilkinsburgh, on the west. That area is five times larger than that of the city of Pittsburgh proper. I have got mains on only a few of the leading streets. I expect to have a mileage there some of these days that will come up to something like that of St. Louis or Chicago.

Mr. Page—The cost of the raw material, as given by you, would be as follows: 2,000 feet of natural gas, at five cents—ten cents; 12 gallons of crude oil, at two cents—24 cents; 100 pounds of anthracite coal, at 20 cents. How much gas do you get from that?

Mr. Denniston—I put into my holder, with my single cupola, anywhere from 5,000 to 6,000 cubic feet. One cupola at Sewickly, put up since mine was, and a little larger than mine, is being operated by a gentleman named Forbes, who says that he beats the record, for he puts in 10,000 cubic feet. As I have said, the cost of the gas will be in proportion to the output. In other words, if you can run two cupolas the cost of the gas will be less than if you run but one. If you make 100,000 feet it will cost proportionately less than if you make 20,000 feet.

Mr. Sherman—Is there any water gas in that?

Mr. Denniston—Not a particle, unless you want to put it in.

Mr. Sherman—In those figures no allowance was made for steam?

Mr. Denniston—No. We are operating the Springer cupola, because it answers our purpose better than any other, and because of its insignificant cost as compared with what others want to charge us. They made a fair arrangement with us for the use of their cupola, and we are using the Springer cupola in which to convert the natural gas. By means of an additional expenditure of $500 these cupolas can be made ready to manufacture water gas in case natural gas fails. We made that arrangement with them. They guarantee that they will make water gas if we cannot get natural gas.

Mr. Egner—There is 12 gallons of oil, 2,000 feet of natural gas, and 100 pounds of coke. Now, as there is 4,000 feet of gas to be accounted for, are we to understand that the increase comes from the oil and the coke?

Mr. Denniston—Yes; but the increase in the bulk of the natural gas is considerable in itself.

Mr. Egner—I was in doubt about your statement, and wanted to understand it.

Mr. Denniston—Seeing is believing. I do not wonder at your doubting; I doubted myself at first. I want you to come and see it. It is worth your while to come and see it. If you conclude to try it and it does not do what is claimed for it, it will be taken away again without a cent being charged.

Mr. Harbison—At what temperature is the gas measured?

Mr. Denniston—I cannot tell you precisely. I presume at about the usual temperature of coal gas after passing through the purifier. I have a station meter, and I measure the gas as it goes through. We have tested it, both theoretically and by putting the meters on. We cannot get it exact, for the reason that, at the high pressure of the natural gas itself, it is difficult to use the meter; so we have to reduce that in order to make a correct measurement. We say to the people from whom we purchase the natural gas that it does not make any difference whether they take our estimate or put their meter on and measure it for themselves. In point of fact, I am paying them for 27½ per cent. of the output, and I do not believe that I use over 33 per cent. at the very most. Sometimes, possibly, it is over that. If you reduce the candle power you can take up more natural gas. If you want to get high candle power you can use that much less, and put in more oil, or steam.

Mr. Page—Is the gas more or less smoky than coal gas?

Mr. Denniston—I cannot notice much difference. It is probably not as smoky as rich coal gas. In any rich coal gas some unconsumed carbon is carried up to the ceilings of the rooms. I have noticed, when I attempted to make rich coal gas, that the ceilings got very dirty. It is not any more so with natural gas than with rich coal gas. It is being used in the best houses in the East End, and in Sewickly; and we have had no complaint wherever it has been put in.

Mr. Page—What is your estimate of the condensation?

Mr. Denniston—Nothing at all. I take no account of it. It does not condense in anything like the degree that coal gas does. Of course, if you want to hurry the operation you can make a condensable gas. You can run it through so rapidly that you will have only a vapor. If I could make coal gas as cheaply as this I would not be selling these machines right around Pittsburgh, where they can dump the coal right out of the coal bank into their works. Coal gas can be made there as cheaply as it can anywhere else in America. Of course, in estimating the cost of coal gas you consider your residuals and take them off your first cost. You expect to sell so much tar and coke, and, in large works, you expect to get something for your ammoniacal liquor. That all counts, and

of course reduces the first cost of your coal gas; but when these have been disposed of to the best possible advantage, and when such items as difference in cost of and repairs to plant are concerned, and a balance is struck, you will find that the Critchlow-McKay process gas is by far the cheapest. This process is now being used in Allegheny, Sewickley, in the West End, and in Pittsburgh proper. At first I did not like the name of the thing. I was fearful that the consumers would "kick;" that they might say, "These fellows are getting natural gas at 10 cents and selling it to us at $1.50." I did not want any ill feeling of that kind, and so they did not know what they were getting until the general sentiment became decidedly pronounced in favor of the increased candle power of my gas.

Mr. Critchlow—I would like to answer Mr. Egner's question. He thinks that there is an apparent shortage in Mr. Denniston's account. That comes about in this way: The composition of natural gas is 70 to 90 per cent. marsh gas. The decomposition of that, as we find in practice, gives us 1,000 feet of hydrogen gas from putting 350 feet of natural gas into the cupola. That is a practical test. Theory will give you still more. We have demonstrated that fact—making all due allowance for temperature—that putting 350 feet of natural gas through incandescent coke puts 1,000 feet of gas in the holder, with the use of 2 gallons of oil per thousand. Since the question of cost has been raised, I do not know that our Company has any objection to going on record with regard to it. At West Pittsburgh we are putting gas in the holder, exclusive of superintendence, at a cost of 13 cents per thousand. We have 20 cupolas in Western Pennsylvania and in Ohio, where the price ranges from 11 to 18 cents per thousand. We use 2 gallons of crude oil per thousand (which costs us 2 cents per gallon at the works), or 4 cents for oil. We use 20 pounds of coke, which costs us about 5 cents a bushel at Pittsburgh. The cost of the natural gas is 5 or 6 cents per 1,000. We are satisfied, from experiments made, that in putting 1,000 cubic feet of gas into the holder we are only using one-third that amount of crude material; consequently we pay the natural gas people 2 cents per 1,000. Now, adding a fair charge for labor, we find that the fixed product costs us, at West Pittsburgh, about 13 cents, exclusive of superintendence. To be perfectly safe, we will put the cost at from 13 to 18 cents. I think I am entirely safe in saying that three-fourths of the illuminating gas made in Pittsburgh to-day is either from natural gas or decomposed water gas. One-third of it is water gas, one-third natural gas, and the balance is coal gas. If there is any apparent discrepancy in the statement as to what can be done, I shall be glad to be corrected by anybody who thinks he sees anything which is not strictly accounted for.

Mr. Scofield—What is the object in making water gas when natural gas is so much the cheaper?

Mr. Critchlow—Both at Allegheny and at Pittsburgh Mr. Young and Mr. McElroy had a contract with the Granger folks for the erection of these cupolas (theirs are the works in which the majority of this gas was made) prior to the successful operation of our system. In short, these gentlemen were making water gas, and in fact Messrs. McElroy and Young have only been converted to our system within the last 3 months. There are gentlemen in this room who will testify that, in answering inquiries made to them about our system, Messrs. McElroy and Young have spoken well of it.

Mr. Scofield—I have had some correspondence with Mr. McElroy. I visited his works last year, at which time Mr. Young was using 14 per cent. of natural gas. Hearing about the Critchlow process, I corresponded with Mr. Young, and also with Mr. McElroy, in order to learn from them the facts of the case, and they stated to me substantially what Mr. Critchlow says. They corroborated all of the statements that Mr. Critchlow has made, and I think went a little beyond, if anything. Being somewhat interested in the gas business, since I am located in the natural gas district in Kansas, I have been looking into this matter so that I might be able to hedge myself against all influences and combinations that might affect my business.

Mr. McMillin—It occurs to me that a little water gas might not be a bad thing in connection with this system. Having always been a water gas man, I feel like adding a word when I can. In passing natural gas through the incandescent coke, and decomposing it, they throw down some carbon. If they did not use that in heating up their cupolas of course they could use it very advantageously in decomposing steam and making water gas. It is already there at the proper temperature, and by passing steam through it they can make water gas cheaper than we could make water gas if we were making it in the usual way. And, again, the natural gas, before it is put through this process at any rate, and possibly after, is a little deficient in the properties that give it intensity. While it is the greatest heating gas known at the present time, so far as quantity is concerned, yet in intensity it is very low. I would expect some advantage in using a little water gas in connection with it.

The President—I do not see what would be the use of going to the trouble of decomposing natural gas, and attempting to use it in Critchlow's process, or in any other, when this Welsbach burner is about to do away with all processes. All you have to do with it is to use the natural gas directly.

Mr. Denniston—Some statements have been made here with regard to the electric light. You would not need anything but gas when that new burner comes out. You remember what a tumble there was in gas stock some years ago. I did not believe in this thing for some time. I do not say it is not possible for you to have such a burner. I was guarded in my statement about natural gas as an illuminant. I have examined all the burners that came out. I have tried them all. There are some burners that will make a better light than the ordinary burner. You have to have a burner for coal gas, and a burner for water gas, and there is going to be a burner for this gas; but, in the meantime, do not fool away your time, but utilize what you have got.

The President—This burner is so great a success that it is said that some Pittsburgh and Philadelphia men have put $10,000,000 into it.

Mr. Denniston—I have heard of that. You can see what you can do with one of these machines as against the electric light. I do not mean to say that you may not get a burner that will use natural gas and burn it well, but I do know that natural gas can be made a good and cheap illuminant—cheaper than you are making to-day out of coal gas—and that with it you can defy competition.

Mr. Egner—I will ask Mr. Critchlow to explain the method by which natural gas is converted into illuminating gas. I for one do not understand how they convert it. I guess at it, but I do not know it. For our general information perhaps he will tell us. It is patented, and so there can be no harm in describing it.

Mr. Critchlow—I have no objection to stating it. You pass the natural gas in as you would steam. We have the cupola so arranged that, by reversing the valves, we pass natural gas through the same opening that we did steam when making the water gas. It passes in at the base and up through the fire; the oil or hydrocarbon is injected above the fire, and it all passes through the superheater together, just as in water gas manufacture. The decomposition is effected in the passage through the fire. Our claims are strictly process claims, and are applicable to water gas apparatus.

Mr. McMillin—I think when Mr. Egner goes back to his office, and gets to figuring on the chemical composition of the gas as it enters the cupola, and what it would probably be when it emerges, after being subjected to that sort of heat, he will see that the claim they make—of getting three to one—is not an unreasonable one; and even if not enriched at all I would expect it to be a better light than it was before, by reason of the very large excess of free hydrogen which would be in it. In many localities the natural gas has no free hydrogen, and in none of them has it enough to give it the proper temperature. Those of you who have seen natural gas burning will remember that they had to burn a very large flame in order to get any light at all, and that there is no distinct demarcation between the blue part of the flame and the bright part—the blue runs up into the yellow, and the yellow runs down into the blue. The result is that the carbon burns up instead of becoming incandescent. It is all burning there together, because it is a compound. It is marsh gas, CH_4. When he passes that through coke he breaks it up. He forms some compounds which are higher than marsh gas, and which will add illumination, even when burned under the same circumstances. In addition to that, he gets a larger per cent. of hydrogen, and that hydrogen will burn down towards the tip of the flame and heat the carbon up to incandescence. Natural gas so treated would give a better light, even were no oil used, than it would in its original state.

A Member—Does Mr. Critchlow measure the natural gas that is used?

Mr. Critchlow—We have measured it at times in order to demonstrate to the natural gas company that we were using such a proportion as we claimed to be using; but in ordinary practice we do not measure it. We prefer to have it go into the cupola at a pressure of two pounds, and having demonstrated that by paying them a certain percentage on our output we were making a just and equitable arrangement with the company, we then put it in directly from their high pressure mains. We have one works, however, at Titusville, Pa., where they measure it through a six-inch meter. It is much cheaper, however, to run it through under high pressure, as we can use a two-inch pipe; whereas, under a low pressure, and measuring it, we would have to use a six-inch pipe and large meter.

[This ended the discussion.]

COMMITTEE OF ARRANGEMENTS.

The President appointed, as a Committee of Arrangements for the next annual meeting, Messrs. Henry Pratt, E. H. B. Twining and Geo. C. Hicks.

A member asked the following question:

"*Would it be policy to adopt three shifts of men in a retort house, each gang to work eight hours per day as a day's work?*"

Mr. Egner—I believe it would be policy, for I think that 8 hours per day will eventually prevail, and I so believe it would seem to be good policy to take the bull by the horns. But we ought to introduce the system in the fall of the year, or when labor is looking for a market. During that season many men are looking for work, and there would be no difficulty in securing their services on equitable terms. Many men who can do eight hours' work in a retort house would break down were they asked to labor for 12 hours. I believe it would be a good thing for us to introduce it, because I am satisfied that eventually we will have to come to it. Retort house work is beastly work, and we will have to come to 8 hours unless we can get charging machines which will take the place of manual labor. Here in St. Louis ordinary laboring men get $1.50 per day, while in the retort house we pay $2.75. I believe that we could get three men to do the work at a sum equivalent to that which we now pay two.

The President—In view of the agitation of the labor question throughout the country this is an important matter. It may be that we shall have to fall back on Egner's plan of cheaper labor and shorter hours. We find now that it takes three men really to do the work of two. That is what it amounts to with us; but with our present high rate of wages we cannot afford to use three shifts of men.

VOTES OF THANKS.

On motion of Mr. Howard, the thanks of the Association were tendered to Mr. John Fullagar, the retiring President, for the able and impartial manner in which he discharged the duties of his office.

On motion of Mr. Thomas, a vote of thanks was passed to Secretary Littleton.

The Association then adjourned, to meet in Chicago, on the second Wednesday of May, 1888.

SPECIAL ENGLISH CORRESPONDENCE.

COMMUNICATED BY NORTON H. HUMPHRYS.

SALISBURY, July 9, 1887.

The Coke Market.—Ammoniacal Liquor as a Manure.—Detection of Leakage from Gas Mains.—Purification of Oxide of Iron in situ.—Societe Technique de l'Industrie du Gaz en France.—The Production of Sulphate of Ammonia.

The Belgian Association of Gas Managers have decided to hold an exhibition of coke heating appliances, with the object of stimulating the demand for that product, by bringing before the public a collection of the best appliances for its use. The stoves used for exhibition are first to be submitted to certain tests, and all that satisfactorily pass this criterion are to be exhibited free of cost to the owners, at some convenient place in Brussels, during the last four months of the present year. Jurors are to be selected by the Association, and the decisions of these gentlemen will be published before the exhibition opens—an excellent improvement, by-the-way, on the usual plan of not appointing the jurors until the close of the exhibition. Prizes to the value of £240 are promised. The organizing committee comprises the President of the Association and four prominent members, all occupying important positions in connection with the Belgian gas industry.

This enterprise, in connection with the most important bye-product in gas manufacture, is refreshing as compared with the indifference generally prevailing amongst the principal producers of gas coke in this country, who, for the most part, are satisfied to get rid of it for what it will fetch. Very large quantities are frequently sold to dealers at absurdly low rates, with the result that the whole of the country is deluged with cheap coke, and in small country towns, where, in the absence of competition, the limited production of gas coke could readily be disposed of at prices nearly equaling that of the current rates for coal in the district. The value obtainable is forced down, sometimes as much as one-half, by the influx of large consignments from a distance. Some years ago one of our principal gas engineers (I think it was Mr. Warner, of South Shields) showed that if each gas consumer used only a few hundred weight of coke per annum the whole of the surplus could readily be disposed of in the district. And there are noteworthy cases of gas managers having a large production of coke to dispose of who successfully realize good values for the same in their own district, even in the face of active competition. Coal is cheaper than it used to be, and there is the increasing production of coke; so in any case we must expect some depreciation in market values. But this depreciation has been of late years considerably greater than is explainable by those causes, and I cannot account for it in any other way than the prevalence of the plan of selling coke at a take-it-away price, sometimes, and not unfrequently, with the proviso that it shall not be offered for sale within a certain distance of the seller's works. Thus some trifling and temporary advantage is secured, regardless of the fact that some other gas undertakings are seriously injured. Such a rash and mistaken policy cannot but result in an all-around levelling down of coke values in which those who practice it must inevitably share. And the general popular opinion respecting its value will diminish until at last it will be regarded as a refuse product, like breeze and cinders. Of course, the price obtainable in Belgium for coke is higher than that current here, and therefore a larger margin is available for a return on any expenses in the way of advertising it. For all that there is plenty of room for an enterprise of a similar nature in many of the large towns in this country. In Paris the gas company has always made a special department of the coke sales, including the introduction of suitable stoves for its consumption.

As there is a difficulty in disposing of ammoniacal liquor in small, out-of-the-way country towns, the following bit of information, contributed by "J. F." to the correspondence columns of the *Journal of Gas Lighting*, is worthy of reproduction: "It has been employed at Brackley, in Northamptonshire, on grass and other lands for the last two years with very good results. I induced a farmer to give it a trial on a piece of land near the gas works, and there is now on the land where the liquor was applied about the heaviest crop of grass to be seen in the neighborhood. He is so pleased with it that this year he has taken the whole stock of liquor." I have myself applied ammoniacal liquor to grass lands with very satisfactory results, and for several years the portion of the field that had been treated with the liquor was sharply defined by the luxuriance of the grass growing upon it, as compared with other parts of the field. The liquor was diluted with three or four parts of water, and applied by means of an ordinary road watering cart. The dilution is necessary to guard against the corrosive influence possessed by the sulphide of ammonium present in the liquor, which otherwise might wither the herbage; and it is possible that the neglect of this precaution in some cases may have brought ammoniacal liquor into disrepute with farmers.

A system for the detection of leakage from gas mains, devised by M. Rattier, has recently attracted a great deal of attention in France. The essential point of novelty is the adoption to the ordinary india rubber bag, used for temporarily plugging main pipes, of two tubes, each passing through the substance of the bag in two places, viz., at the point of greatest diameter and near the neck. They are sufficiently small to pass the plug hole by which the bag is introduced, and are situated on opposite sides. They thus furnish a direct communication from the interior of the main on each side to the exterior, and they can be coupled up to a meter or other indicator. The object of this arrangement is obvious. A section of main having been selected for experiment, the end of it farthest from the gas supply is plugged by any of the usual methods. At the other end one of the special bags is introduced, and the india rubber tubes furnish a communication both with the live main and with the section under test, and thus avoid the necessity of drilling special holes for that purpose. The pipe from the live main is then connected to the inlet of a meter, and that leading from the section to be tested to the outlet. By means of this system the mains could be tested without drilling any additional holes whatever, the nearest service pipe being used for the introduction of the rubber bags. It is especially easy of application when laying branches from a live main, the gas being allowed to follow each section at the close of the day, and thus the pipes could be proved before being covered up. In a similar manner it is very useful for testing services. By the aid of two or three of M. Rattier's bags the system can be readily modified to suit particular circumstances. It is imperative, of course, that the bags and tubes should be thoroughly sound, and this can be easily proved.

A new notion for the revivification of oxide of iron *in situ*, and without shutting off the gas, has recently been the subject of an experiment at Blackburn, conducted by Mr. Ogden, the manager of the gas works, and Messrs. Dempster, of Elland. For some years past the practice of admitting a trifling percentage of air to mix with the gas at some point anterior to the purifiers, for the purpose of prolonging the life of the oxide purifiers, and obviating the nuisance which arises when they are opened, has existed. But the objection has been that only the oxygen is absorbed in the purifiers, the nitrogen serving to dilute and depre-

ciate the gas, and necessitating the use of an additional quantity of cannel to keep it up to the mark. Mr. Hawkins, as is well known, has attempted to meet this difficulty by carburetting the air before using it, and his process has attained some degree of success. Mr. Ogden, having learned that "Brin's Oxygen Company" had succeeded in producing pure oxygen for 66 cents per thousand cubic feet, decided to try that product instead of air. With pure oxygen there is the advantage that the whole of the extraneous gas admitted will be absorbed in the purifier, and if a slight excess should escape and pass on with the gas the result will be advantageous rather than otherwise, for it has been observed that the presence of not more than one per cent. of oxygen in coal gas improves its quality. The experimental apparatus comprises two purifiers, each 6 feet square, and special arrangements for admitting the oxygen in the proportion of one cubic foot to each 100 cubic feet of gas. About one million cubic feet of gas have already been treated, with highly satisfactory results. The oxygen has been brought from London, in a compressed state, contained in wrought iron vessels.

The annual meeting of the Societe Technique de l'Industrie du Gaz en France was held at Nancy, a fortnight since. The President, M. Alavoine, made the question of the gas supply of Paris, and the efforts that have recently been made by the municipality to introduce regulations as to the constitution of the same, the principal subject of his inaugural address, especially discussing the proportion of carbonic oxide usually present in coal gas, which had been assumed by the authorities to run as high as 10 or 12 per cent., whereas about 6 per cent. would be nearer the mark. I alluded to this subject in my letter which appeared on May 2. Some members of the Municipal Council appear to have had their attention directed to some experiments made in Germany, which go to show that the characteristic odor of gas is removed by filtration through a quantity of soil, and also to the fact that many cases of poisoning with water gas had occurred in America on account of the large proportion of carbonic oxide gas present in it, and they consequently fear that there is some risk of "deodorized" gas finding its way into houses from leakage in the mains, and poisoning the inmates by means of the carbonic oxide present in it. They wish to limit the proportion of carbonic oxide to something less than 4 per cent. An interesting array of papers was presented for the consideration of the meeting. A prize of 500 francs was awarded to M. Lucien Monnier, manager of the gas works at Saint-Jean-d'Angelly, for his memoir entitled, "A Theoretical Study of the Flow of Gas in Long Pipes." Another memoir, on the subject of the "Condensation and the Washing of Gas," is to be converted into a communication by the author, whose name is not given.

In the report of the chief inspector under the Alkali, etc., Works Regulation Act, for the year 1886, it is stated that the total production of sulphate of ammonia throughout the year in the United Kingdom was 106,610 tons, of which gas works produced nearly four-fifths, and shale works the greater part of the remainder. Only about one-fifth is used for agricultural and chemical purposes in this country, the remainder being exported, principally to Germany. The chief Inspector (Mr. A. E. Fletcher) expresses a hope that English farmers will soon learn the value of this article as a manure. It is produced in all parts of the country, and must necessarily be more valuable in the immediate neighborhood than when loaded with heavy charges for carriage. Considerable attention is devoted to the Claus process for the production of pure sulphur from the fumes which are the residue from the manufacture of the sulphate of ammonia, as a means of turning the sulphuretted hydrogen to some useful account, the plant in use at the Leicester gas works being illustrated as an example. This is an interesting specimen of a modern sulphate plant on a large scale, its capabilities being nearly 40 tons per week. The sulphur plant comprises a small kiln or furnace, a condensing chamber 33 feet long by 12 feet wide, a long brick flue of large size, and an oxide purifier, 13 feet square.

Artesian and Gas Wells.

The *Scientific Press* says that within a radius of ten miles in and around Stockton, Cal., there are a goodly number of artesian wells, and an accompanying cut gives a view of the artesian well situated on the Cutler Salmon farm, 7 miles south of Stockton. It is 1,250 feet deep, and discharges 300 gallons a minute from a 7-inch pipe. In sinking, at 280 feet the auger passed through a layer of timber and rotten debris 20 feet thick.

From this point the water was dark colored, brackish, and unfit for use. When the well was finished the water rose 22 feet above the surface, and it was by accident discoverd that this great volume of water was strongly impregnated with gas. A gasometer has been placed in the building, shown in the cut, and light and fuel are supplied for the residence. In the winter season the gas is kept burning all night. At a depth of 800 feet the water is tapped and brought to the surface in an independent pipe. This is a mineral water, and has been found very valuable as a remedial agent in the treatment of rheumatism, gout, and kidney complaints.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Creosoted Brick for Street Pavement.—Many experimenters have endeavored, and with more or less success, during the last decade, to so treat red brick that it might be profitably employed as a material wherewith to pave roadways. The technical journals frequently contain reference to the attempts of this or that inventor to compass the desired end, but we are not aware that any special prominence has been accorded to the results obtained at Nashville, Tenn., by Mr. W. T. Watson, who it would seem has at least satisfied the Board of Public Works of that city that the Watson creosoted bricks answer the requirements needed in the construction of a satisfactory street pavement. Early in the present year Messrs. Ewing (Chairman) and Nestor, of the Nashville Board of Public Works, made a report regarding a specimen section of public roadway that had been put down by Mr. Watson, and, thinking that gas men will, for obvious reasons, be interested in the premises, we herewith reproduce the verdict of the Commissioners: "Nearly two years ago Mr. W. T. Watson, engaged in the business of roofing, paving, and the distillation of coal tar, stated to us that he had for years been carefully experimenting on creosoted brick as a material for street paving, and believed he had succeeded in so charging every pore of medium-quality bricks with coal tar that these were rendered practically indestructible as to wear; moreover, that bricks so treated became impermeable to all liquids, deleterious or otherwise. The Board thereupon allowed him, as an experiment, to cover with the creosoted brick the space at the intersection of Union and Cherry streets, including the treadway of the street railroad. That point, besides being perhaps the most traveled over of any in the city, presented a further obstacle to the life of a street pavement, in that the roadway is very narrow. Mr. Watson carried out his agreement, and the path was given over to the effects of ordinary, everyday travel. Recently the experimental section was thoroughly cleaned off and carefully examined, whereupon it was ascertained that the constant wheel-friction had not only not occasioned any abrasion of the bricks, but also no wheel marks were visible. In fact the wear and tear to which the road had been constantly subjected for nearly two years appeared simply to have polished the treated bricks, and caused them to deaden the rumble of vehicles which passed. The footway followed by the street railway horses exhibited but very little sign of wear. It is our judgment that the experiment of laying street pavement with creosoted brick is an entirely successful one, and we hope in the near future to witness a trial of the experiment on a more extended scale. It seems to us that this brick is to be the paving material of the future. The filling of the pores of the brick with boiling pitch apparently toughens the clay material, serving to remove the ordinary brittleness of burnt clay when the latter is subjected to great pressure It being impervious to all liquids, while non-treated brick is not, is a feature of great value in a sanitary point of view. Durability, healthfulness, and noiselessness may, we think, be safely claimed for this new style of pavement." Perhaps gas men might do well to inquire more closely into the merits of the Watson process, for certainly the Nashville Board of Public Works seem to be believers in its merit.

Old Wooden Water Pipes in Montreal, Canada.—Awhile ago we noted that the Montreal Gas Light Company proposed to extend and perfect its system of gas mains in the Cote St. Antoine district of that city. This work is now in progress, and during the course of the necessary excavation work a long line of disused wooden water pipe was observed. The pipes are about 12 ft. in length, one end being bound with a iron ring, the other extremity being somewhat pointed or tapering. The wood material (chiefly spruce) was in good preservation. A correspondent, in calling our attention to the fact, writes: "Considerable curiosity has been evinced as to how and when these pipes were laid, and I send you the following, from 'Sandham's Montreal, Past and Present,' in explanation. On page 83 of his book Sandham says: 'Great inconvenience had been felt by the inhabitants of the town from the scarcity of the water supply, the whole of which had either to be drawn from the river or from the town pumps in Place d'Armes, Market Place (now Custom House Square), Jesuit's Garden, near the Court House, and other points. In addition to the inconvenience was the necessity for a more copious supply in case of fire. To meet this want, on April 8, 1801, an act was passed constituting Jos. Frobisher, Jno. Gray,

Daniel Sutherland, Thos. Schieffelin and Thos. Sewell a company for supplying Montreal with water. They were authorized to erect buildings and lay down pipes within the city, and were to raise £8,000 among themselves, but should this not prove sufficient for the work, they were to raise a further sum of £4,000, but no proprietor was to hold more than 16 shares in the first and 8 in the second. The act vested in the company the exclusive right for 50 years, but the main pipes were to be laid before 7 years. The plan proposed by the company was to supply the city from a source in the rear of the mountain, and with this in view they expended large sums of money in laying down wooden pipes. But the supply of water was so scanty and the rude pipes so liable to leak and burst, that they failed to carry the plans into successful operation, and the charter was subsequently sold to another company.'" If Bannister and his associates could but take a look over the present gas and water supply of Montreal perhaps they might be forgiven for suggesting that they were the "original Jacobs," after all.

HOLYOKE, MASS., TO BE LIGHTED BY ELECTRICITY.—Something over a fortnight ago the local street lighting committee voted to accept the terms offered by the Holyoke Electric Light Company for furnishing public lights for a period of three years. The Company agrees to maintain 68 or more arc lights (to burn until midnight) at 37½ cents each per night, 50 cents to be paid for all-night lights. Last year the rates were 45 and 60 cents respectively.

THE TRANSFER COMPLETED.—We understand that the details concluding the transfer of the old Manchester (N. H.) Gas Light Company's plant to the promoters of the Peoples Gas Light Company were perfected on July 8. The new Company organized by electing Mr. John B. Varick to the Presidency, Mr. Frank Dowst having been chosen Vice-President. Mr. Africa has been named as Superintendent.

THE OUTCOME AT DECATUR, ILLS.—After two years of legal warfare, lines of battle at various times being drawn in the Circuit, Appellate, and Supreme Courts, the proprietors of the Decatur Gas Light Company have at last achieved a decisive victory, the "enemy" having been routed in the final contest before the Decatur City Council. The matter was about like this: The Company had been charging the city and ordinary consumers at the rate of $2.15 per thousand cubic feet of gas consumed, and no particularly great objection was made to the charge. Some malcontent, however, discovered that the ordinance under which the Company operated contained the stipulation that gas should be sold at a price identical with the one which ruled in Springfield, Ills., the prevailing rate there being $1.50 per thousand. By the way, that sort of bargain is not in as great favor now as was formerly the case, and a rather risky one it is in any event. For instance, the original obtainers of the Decatur grant pledged themselves not to exact a higher gas rate than that made in Springfield (39 miles west of Decatur), the promise being given at a time when, presumably, the two places were governed by something like similar commercial conditions; but, from one cause or another, Springfield progressed more rapidly than did its neighbor, and at the time of the malcontent's discovery the Springfield gas makers were selling annually 500 per cent. more gas than that sent out by their Decatur brethren. Despite the disparity, the Decatur man wanted his pound of flesh, but we are happy to add, owing to the action of Council, he had to be satisfied with a pound that contains, say, 8 ounces. Well, the malcontent roused his fellows, the result being that several consumers refused to pay in excess of $1.50, and the matter was brought to the attention of the courts. When the Supreme Court stage was reached, that accumulation of the law decided that the Springfield price must govern. Not disheartened over the decision, the Company appealed to the Council, who, strange to say, listening to the voice of right and justice, consented to the repeal of the old ordinance, and the institution of a new agreement. Under the provisions of the new franchise the Company is authorized to charge $2 per thousand to ordinary consumers, a discount of 25 per cent. being granted to those whose monthly bills show the consumption in that period to have been at or over 45,000 cu. ft. Of course, this enables the city to secure its gas supply at the rate of $1.50. We congratulate the Decatur gas men on their pugnacity, to which we feel bound to add a word of praise in favor of the local Council. Indeed, the Decatur Council seems to be an exceptional body, for they appear to have some regard for other people's property.

A WAIF FROM WORCESTER, MASS.—Work on the new holder to the order of the Worcester Gas Light Company is being vigorously prosecuted. Although we mentioned something about it at the time it was determined to build the vessel, we may say that it is to have a capacity of 400,000 cu. ft., and that the proprietors of the Continental Iron Works (Brooklyn, N. Y.) are the constructors. In excavating for the tank a rather bad bed of sand and gravel was encountered, but good sheeting and careful engineering finally triumphed. The holder will be completed in time for the busy season of the coming winter. While talking of Worcester affairs, we are happy to be in position to say that Agent Rollins is rapidly recovering from a sickness which at one time appeared alarmingly dangerous.

ANNUAL MEETING, COLUMBUS, GA.—At the annual meeting of the stockholders in the Columbus Gas Light Company the following officers were chosen: President, T. E. Blanchard; Sec. and Treas., Amory Dexter; Supt., E. H. Jenkins; Directors, T. E. Blanchard, A. Dexter, C. B. Grimes, D. F. Wilcox, and W. L. Clark.

A LINE FROM LOUISVILLE, KY.—Another act in the Louisville gas drama (or farce) was completed on July 13th, the stage having been set in the office of Mr. Chas. R. Long. The "lines" called for the election of a board of officers to control the affairs of the Citizens Gas Light Company during the ensuing year. After considerable "prompting" the following were chosen: President, C. R. Long; Vice-President, J. M. Atherton; Directors, W. R. Ray, A. H. Barret, B. Bloom, A. P. Humphreys and E. W. Herman. The capital stock, which was formerly $1,000,000, was reduced to $50,000 "by the unanimous desire of the board."

DID NOT LIKE GAS METERS.—R. S. Clifford, a jeweller, living in Lowell, Mass., was arrested at the instance of the Lowell Gas Light Company for having tampered with a gas meter that was supposed to register the gas consumed in defendant's shop on Shattuck street—that is, the meter would have registered the gas were it not for Clifford's ingenuity. Defendant was also a firm believer in the utility of gas as an agent for domestic purposes, for it was subsequently discovered by the Gas Company's inspector that Clifford, by means of a false connection, had been using gas for cooking in the kitchen of his residence, the latter being located on Mt. Vernon street. It is needless to add that he paid as much for gas on Mt. Vernon street as he did on the Shattuck street site; the price being *nil* in both instances. Perhaps the neatest one of his swindling operations was that in which he managed to tap the telephone circuit of the local telephone company, and actually maintained a private exchange of his own, using a queerly-contrived switchboard devised by himself. Look at him in any light, Clifford must be regarded as an ingenious rascal, but we imagine that by the time he is through with the Lowell Gas Light Company that corporation will have convinced him that honesty is the best policy, after all.

WHAT DOES ELMIRA (N. Y.) WANT WITH ANOTHER GAS COMPANY?—On July 13th articles incorporating the Elmira Illuminating Company were filed at the office of the County Clerk. The following are named as the incorporators: Messrs. J. A. Reynolds, J. M. Shoemaker, J. B. Stanchfield, H. E. Baker, W. M. Clark, J. A. Woods and F. H. Leonard, Jr. The avowed object of the Company is to furnish gas and electricity for illuminating and motor purposes, and the capital stock is placed at $200,000.

IN ORDER to better serve the convenience of the gas consumers of Louisville, Ky., President Morris has ordered that the city be divided into two collection districts, Fourth avenue being selected as the separating mark. In the district east of the avenue gas bills will be presented on the first of the month, while those in the western division will fall due on the 15th. This arrangement is intended to give all a fair chance to secure the rebate or discount which holds good but for five days from the presentation of the monthly account.

THE SUPREME COURT (N. Y.) AND NAPHTHA GAS.—We reproduce the following Associated Press despatch, dated "Middletown, N. Y., July 14: The General Term of the Supreme Court, Part II., in session at Poughkeepsie, has just handed down a decision affirming the verdict of the lower court in a novel and important case relating to the manufacture of gas from naphtha. Margaret Bohen, whose dwelling adjoins the manufacturing plant of the Port Jervis Gas Light Company, brought suit, in the Supreme Court of Orange County, against the Company to recover damages for alleged injuries to the health and comfort of herself and family, and for the depreciation of the value of real estate caused by the noxious fumes exhaled in the process of manufacturing illuminating gas from naphtha. On trial of the cause, at the May term last year the jury found, as a matter of fact, that the plaintiff had suffered injuries by the noxious fumes from the gases complained of, and the jury assessed the damages at $340, whereupon Judge Cullen, who

was on the bench, on motion of plaintiff's attorney, granted an injunction restraining the Company from continuing the manufacture of naphtha gas to the detriment of the plaintiff. The defendant subsequently obtained a stay of the injunction on appeal by giving bonds to answer all damages. The appeal now stands overruled, but the case will be probably carried to the higher tribunal for the adjudication of issues of far-reaching public concern."

MR. GARRET CHOSEN A DIRECTOR.—The annual meeting of the Consolidated Gas Light Company (Balt., Md.) was held on July 18. The ballot for officers brought out the largest vote ever known in the history of the Company, 46,908 shares being accounted for. The only change made in the *personnel* of the board was that Mr. Robt. Garret was selected to succeed Mr. A. Jenkins, who declined a re-election. Organization was effected in the following manner: President, Capt. Jno. W. Hall; Secretary, Col. L. R. Smoot; Treasurer, C. F. Peregoy. It was broadly hinted that Mr. Garret is still a large holder of Consolidated stock, and, having severed his connection with the Chesapeake and Equitable Companies, that he will lend his assistance entirely to the interests of the Consolidated Company.

ATLANTA (GA.) GAS STOCK.—In our last we noted that the authorities of Atlanta wished to dispose of enough of the stock owned by the city in the Atlanta Gas Light Company to insure the erection of a high school. The bids (2 in number) were opened at noon of July 18, and the sellers were surprised to find that Mr. J. M. Alexander offered to buy 100 shares at $15 per share, while Messrs. Pratt & Jones, local bankers, offered $17 a share for the lot. The officials thought that the offered prices were altogether too small, and some of them urged that the city should dispose of all its gas share holdings. Mr. Hemphill, who favored the latter project warmly, offered the following: "*Resolved*, That the Finance Committee and the Mayor sell, at private sale, all the gas stock owned by the city of Atlanta, and that $25,000 of the amount received be turned over to the Board of Education, for the erection of the high school, as heretofore appropriated. The amount that is left to be held by the Committee, subject to the order of the General Council." The resolution was adopted, and Atlanta will soon be rid of the golden goose. The "private sale" portion of the resolution looks peculiar.

GREENFIELD (MASS.) GAS MATTERS.—The annual meeting of the Greenfield Gas Company was held on July 21. Mr. S. O. Lamb, who has been Clerk and Treasurer of the Company for over a quarter of a century, refused a re-election, and Mr. W. R. Howland was appointed in his place. The directors chosen were Messrs. F. R. Allen, W. B. Washburn, F. A. Pond, D. Malone, J. B. Hatch, and J. D. Safford. A committee was selected who were instructed to inquire about the wisdom of establishing an electric light plant in connection with the gas supply. It was also voted to reduce the price of gas from $2.75 to $2.50 per thousand cubic feet, prompt payment to entitle ordinary consumers to a rebate of 5 per cent., said discount to be increased to 10 per cent. where the consumption equaled 15,000 cubic feet per month. A special discount is to be granted on all gas consumed in churches.

A LINE OR TWO FROM NORTH ADAMS, MASS.—At the annual meeting of the North Adams Gas Company, a large number of stockholders being present, the following board of officers was chosen: President, W. L. Brown; Vice-President and Treasurer, F. S. Richardson; Clerk, A. D. Cady; Directors, J. Bracewell, W. H. Gaylord, W. L. Brown, E. B. Hamblen, C. Q. Richmond, E. A. Richmond, and F. S. Richardson. The Treasurer's report, covering the operations of the Company during the last fiscal year, showed that Brother Frank had been strictly adhering to business principles in the twelvemonth, for the sendout showed a gain over last year of something like 11 per cent. New mains are being put down in East Quincy and Brooklyn streets, and the usual amount of renewal work is underway.

NEW GAS COMPANY.—The Greely Gas and Coal Company, of Greely, Kansas, has been incorporated. Those interested in the enterprise are Messrs. W. F. Priest, J. B. Carley, C. H. Lathen, N. S. Endsley, Eli Truefitt, and H. Walker.

DOWN AGAIN, AT NASHUA, N. H.—That Honorable gas man who is in charge of the fortunes of the Nashua Gas Light Company once more appears in the ranks of the reducers, for we note that hereafter gas is to be sold there at the rate of $1.40 per thousand cubic feet. If we mistake not this is equivalent to a reduction of 20 cents, and may perhaps give Supt. Norton facts and figures wherewith to further entertain the New England Association. The Nashua *Daily Telegraph*, in alluding to the concession in gas rates, makes the following editorial comment: "We desire to renew, in a public way our repeated commendation of the Nashua Gas Light Company. It has made another voluntary reduction in rates, this time dropping to $1.40, which is a lower figure than that ruling in any other city in New England, that is not three times as large as Nashua. If railroads were run as this corporation is run, the present scheme of monopoly and aggrandizement would not be witnessed in our Ssate." We submit that the above sounds decidedly like "honorable mention."

SOMETHING FROM FOSTORIA, OHIO.—Brother J. Gwynn, Supt. of the Illuminating Department of the Northwestern Ohio Natural Gas Company, with headquarters at Fostoria, has been on the sick list, but his physical depression does not seem to have prevented him from "keeping close to the leaders" in the march of progress. That decision is based on the contents of the following circular, issued from the Company's office, on date of June 8. The circular reads: "During and after this month rates for manufactured illuminating gas will be as follows: For a consumption of less than 2,000 cubic feet per month, $2 per thousand; over 2,000 cubic feet per month, $1.80 per thousand. Gas used in summer in cooking stoves, $1.50 per thousand, provided not less than 500 cubic feet are consumed. These rates will be subject to the usual discount of 10 per cent., if bills are paid at the office on or before the 10th of each month." Possibly the publication of this pronunciamento acted as a sort of "heroic remedy" in the matter of routing Bro. Gwynn's illness. At any rate, we are glad to say that he is himself once more.

STREET LIGHTING AT JACKSON, MICH.—We are indebted to Mr. W. M. Eaton, Treasurer and Supt. of the Jackson Gas Light Company for the knowledge that the local authorities are inclined to give the lighting of the streets exclusively to the electricians. In passing we may say that under the present contract, which will soon expire, the city is lighted by about 40 arc lights (Messrs. Jarvis and Foote being the contractors, and they employ the Thomson-Houston system) and 125 gas lamps, the price paid for the former being 33⅓ cents per night, the gas company receiving $2 per thousand for gas supplied. The lights burn all night and every night. The Council having called for bids for the future lighting of the city, the following proposals were received:

No. of Lights.	Jarvis & Foote.	Markle Engineering Co.
180	$16,425	$12,483
160	15,520	11,680
130	13,000	9,964
100	10,000	8,030
80	8,960	6,716

The bids were based on a 5-year contract, with the understanding that 2,000-candle power lights were to be furnished. The Markle Engineering Company, whose home office or headquarters is at Detroit, owns the Edison plant at Jackson, and therefore would have to do considerable construction work before it could proceed with the lighting. Both companies (their proposals as given above promised that all-night lighting would be called for) submitted a sixth proposition in reference to the demand of the city for 100 lights, to burn on not less than 15 nights and not more than 20 nights each month, and not less than 4 or in excess of 8 hours each night. Messrs. Jarvis & Foote said: "If the 100 lights are operated in connection with the 80 contemplated in the fifth proposition, the price to be 5 cents per hour per lamp, additional; if run independent, 8 cents per hour per lamp—in either case lamps to burn at least 1,200 hours per annum. Should they be burned 1,440 hours or more per year, 4½ and 6 cents, respectively. We will furnish the lamps as above on a five-years' contract, the same to be subject to review by each succeeding Council during the first 30 days of their existence." The Markle Company, in respect of the sixth proposition, said: "Three cents per hour for the time actually in use." Having read the proposals the Lighting Committee recommended the passage by the Council of the following peculiar resolution: "*Resolved*, That the Lighting Committee be authorized to make arrangements with the Markle Engineering Company to put up 25 test lights to run for 30 days. If this Company is finally awarded the contract to furnish the city with electric light, then the price shall be 19½ cents per light per night; if the Council should not conclude to award them the contract, then the price shall be 23 cents per light per night." The resolution was adopted without debate, which shows that the Jackson Council is not inclined to make a very hard fight over the fact as to whether the city shall pay 19½ cents or 23 cents per night per light. Under the existing contract the city pays about $9,000 per annum for street lighting. It will be noted that the Jackson Gas Company did not bid at all, and Mr. Eaton explains that by saying: "We would have bid (on from 200 to 400 gas lamps) at a very low figure if any chance existed for us to secure an award; but as our Councilmen

are all very much in favor of arc lighting, we were convinced that it would be useless to submit any figures. In addition to the two electric light companies our city (it has a population of 20,000) will soon have two gas companies, for the National Gas Light and Fuel Company, of Chicago, Ills., is putting up a plant here. Hence, you see, Jackson will soon hold 'two pair,' and if natural gas should also be found, why, we would have a 'full hand.' The gas well is down 1,800 feet, and no gas as yet; but the contractor says the indications are good. I agree with him—that is, I think the indications are good for him to be paid to drill deeper."

THE NEW ROOTS EXHAUSTER.—By referring to the advertising card of the Messrs. P. H. & F. M. Roots, in this issue of the JOURNAL, it will be seen that they have at last completed their new exhauster, which is constructed on principles that differ entirely from those that governed the make-up of their old-style instrument. The Messrs. Roots claim that their new exhauster is as superior to their old-style of apparatus as that was superior to the general run of exhausters coeval with it in the market.

BROTHER BOARDMAN GETS THERE.—It has been matter of common rumor for some time back that certain financiers were anxious to supply the city of Macon, Ga., with a duplicate gas and water plant. Of course, that is nothing unusual in itself, for speculators are, as a rule, anxious to take advantage of the efforts of the pioneers who have built up a prosperous trade by dint of hard labor and unremitting attention; but as Supt. Boardman is not the man to sit idly by while others are attempting to wrest from him the fruits of his toil and intelligence, we imagined that when the proper time came the speculators would feel that they had not properly estimated the home strength of the old Macon Gas and Water Company. They know something about it now, however, for the city has recently entered into an agreement with the Company to keep up the water supply for a further period of 5 years from the expiration of the present contract. Good enough!

IMPROVEMENTS AT BIDDEFORD, MAINE.—Regenerative furnaces are to be put up in the plant of the Saco and Biddeford Gas Light Company.

GAS MATTERS AT FORT SCOTT, KANSAS.—Mr. L. K. Scofield seems to think that he has borne a trifle too heavy a responsibility in carrying on the financial affairs of the Fort Scott City Gas Company without assistance. At least we judge so from the fact that on the 1st inst. the ownership of the plant, franchises, etc., was vested in a joint-stock company, which is officered as follows: President and General Manager, L. K. Scofield; Vice-President, J. A. Durkee; Supt., E. W. Morse; Directors, L. K. Scofield, J. A. Durkee, W. Chenault, B. E. Langdon, and J. D. McCleverty. Supt. Morse has done yeoman's work under the direction of Mr. Scofield, and we are pleased to observe that Mr. Scofield's confreres have determined to retain Mr. Morse's services. Another important move made in the Company's affairs is the determination to take advantage of natural gas as an aid to coal gas, which determination resulted in the purchase, from the American Gas Improvement Company, of Pittsburgh, Pa., of the right to use the McKay-Critchlow process. [For a description and statement of results secured from this process see *ante*, p. 72.] The adoption of this process in the Fort Scott plant necessitated a considerable expenditure, but when everything is completed the Company will be in position to meet the draughts of all consumers. This last leads us to remark that the Company, in order to satisfy the rapidly increasing demands for gas from the citizens, has put down some 10 miles of gas mains during the present season, and that extension, perhaps more than anything else, will convince our readers that Mr. Scofield really needed help in carrying on the gas supply of his city. The finished gas product at Fort Scott will hereafter contain about 33 per cent. of treated natural gas.

TO BE ABSORBED.—It is more than likely that the proprietors of the Westfield (Mass.) Gas Light Company will purchase a controlling interest in the local electric light company.

HOME AGAIN.—Mr. Jas. Somerville, Engineer to the Indianapolis (Ind.) Gas Light Company, is once more in harness, and is quite pleased with the experiences gained during his recent European journeyings. In a letter to us announcing his arrival home Mr. Somerville says: "I had a most pleasant time. I visited Beckton and the new East Greenwich works, and ascended to the top of the 9,000,000 cu. ft. capacity holder which is being built there. What I saw looked to me more like boiler making than gas holder work. I also had the good fortune to meet Mr. Carpenter, of Vauxhall, who kindly showed me one of his furnaces, which heated six benches of retorts. * * * I also visited some of the Scotch works, where they were making 30-candle gas. I saw no electric lights in London, save in one or two of the club houses."

PUBLIC LIGHTING AT OAKLAND, CAL.—As intimated by a correspondent in our last issue, the authorities have awarded the contract for public lighting to the Oakland Gas Light and Heat Company. Under the agreement the Company is to furnish gas to the 872 street lamps now erected in the city, and for any other lamps ordered erected, at the rate of 10½ cents per lamp per night. Gas is to be furnished for city buildings at 50 cents per 1,000 cu. ft. less than that charged to private consumers, but the rate for same is never to exceed $2.50 per 1,000. The contract is to run for two years.

IMPROVEMENTS AT NORTHAMPTON, MASS.—A new bench of 5's is being added to the plant of the Northampton Gas Company.

ANNUAL MEETING, FALL RIVER, MASS.—At the annual meeting of the Manufacturers Gas Company, of Fall River, the following officers were elected: President, C. M. Shove; Clerk and Treasurer, J. A. Baker; Directors, F. H. Stafford, C. M. Shove, J. A. Baker, A. Brayton, F. H. Dewelly, and C. M. Hathaway.

ANNUAL MEETING, BINGHAMTON, N. Y.—At the annual meeting of the Binghamton Gas Light Company the following officers were chosen: President, J. W. Manier; Vice-President, J. C. Phelps; Secretary and Treasurer, W. G. Phelps; Directors, J. C. Phelps, G. S. Sessions, W. G. Phelps, S. J. Hirschmann, C. W. Stone, N. A. Phelps, and J. W. Manier.

THE Capital Gas Company, of Sacramento, Cal., now operating the Thomson-Houston system, has purchased a 50-light plant of the Waterhouse type. Sacramento gas men are quite busy at present.

Correspondence

[The JOURNAL is not responsible for the opinions expressed by correspondents.]

How Should the Flow from a Natural Gas Well be Determined?

NEW YORK, July 23, 1887.

To the Editor AMERICAN GAS LIGHT JOURNAL:

Since the advent of natural gas, and the prospect of having it piped from the wells into neighboring cities, I have taken some interest in ascertaining the amount that would be delivered through a given diameter of pipe a given distance. For this purpose I used Professor Pole's formula (page 382, "King's Treatise on Coal Gas"), and compiled quite a number of calculations, putting them away in my notebook for future reference. However, a few weeks ago, on visiting a town supplied with natural gas, and observing the size of the pipes, the distance they ran, and the amount of gas issuing at the point of delivery, I came to the conclusion that my calculations were all wrong, as far as natural gas was concerned. The quantity delivered was at least ten times more than ought to have been delivered according to the formula.

I can, perhaps, partially account for this phenomenon by observing that the gas as it issued from the well was intensely cold—so much so that hoar frost (although the day was warm) collected round a leaky joint. Now, is it not possible that the gas, being at such a low temperature at the point of issue from the well, gradually expanded in volume as the temperature was raised, and, as it were, carried its pressure with it? I shall be glad to know if any of your readers have observed this; and if they have arrived at any accurate method of ascertaining the amount of natural gas delivered, allowing for the difference of temperature, which, in the formula I used, is assumed to be the same.

Yours, etc., J. S.

Seeking for Information.

BOSTON, MASS., July 29, 1887.

To the Editor AMERICAN GAS LIGHT JOURNAL:

In the matter of leakage of gas from street mains, *percentages* are so entirely deceptive, varying so much with the amount of business done by different companies and with the seasons of the year, in any case, that I desire to know what amount of leakage per year, *per mile of pipe*, ought to be tolerated by a gas manager? Can any of your subscribers give me any information on this point?

Yours truly, SUBSCRIBER.

THE AMERICAN GAS LIGHT JOURNAL

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England—C. W. HASTINGS, 22 Buckingham St., London, W C
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TUESDAY, AUG. 2, 1887.

Protecting Tall Chimneys from Lightning Strokes.

M. Faraday, in a communication to the London *Architect and Builder*, believes that the conductor should be of half-inch copper rod, and should rise above the top of the chimney by a quantity equal to the width of the chimney at the top. The lengths of rod should be well joined metallically to each other, and this is perhaps best done by screwing the ends into a copper socket. The connection at the bottom should be good; if there are any pump pipes at hand going into a well they would be useful in that respect. As respects electrical conduction, no advantage is gained by expanding the rod horizonfally into a strap or tube—surface does nothing; the solid section is the essential element. There is no occasion of insulation (of the conductor), for this reason. A flash of lightning has an intensity that enables it to break through many hundred yards (perhaps miles) of air, and therefore an insulation of 6 inches or 1 foot in length could have no power in preventing its lead to the brickwork, supposing that the conductor were not able to carry it away. Again, 6 inches or 1 foot is so little that it is equivalent almost to nothing. A very feeble electricity could break through that barrier, and a flash that could not break through 5 or 10 feet could do no harm to the chimney. A very great point is to have no insulated masses of metal. If, therefore, hoops are put round the chimney each should be connected metallically with the conductor, otherwise a flash might strike a hoop at a corner on the opposite side to the conductor, and then on the other side, on passing to the conductor, from the nearest part of the hoop, there might be an explosion, and the chimney injured there, or even broken through. Again, no rods or ties of metal should be wrought into the chimney parallel to its length, and, therefore, to the conductor, and then to be left unconnected with it. The rod may be close along the brick or stone. It makes no difference. There will be no need of rod on each side of the building, but let the cast iron hoop and the others you speak of be connected with rod, and it will be in those places at least as if there were rods on every side of the chimney. A three-fourth rod is no doubt better than a half-inch, and, except for the expense, I like it better. But a half-inch has never yet failed. A rod at Coutts' brewery has been put up 1½ inches diameter; but they did not mind expense. The Nelson column, in London, has a half-inch rod—three-fourths is better. I do not know of any case of harm from hoop iron inclosed in the building, but if not in connection with the conductor I should not like it. Even then it might cause harm if the lightning took the end furthest from the conductor.

Coke in Russia.

An Exchange says that, according to a report just published by the Russian Minister of Finance, Russia imported last year a little more than 100,000 tons of coke, being a considerable advance on the total of the two previous years, although only about equal to the quantity entering the country in 1883. Nearly half arrived by the Baltic ports, mainly from England, while the bulk of the remainder was despatched across the Western frontier from Prussia, for the most part to the Vistula manufacturing districts. With regard to the Black Sea ports, only 100 tons were imported in 1883, and 90 tons in 1884. In 1885, however, the quantity jumped to 4,000 tons, and in the following year to 6,000 tons; upon which the Russian Government at once decided to raise the duty. Until quite recently the home manufacture of coke, except in the Donetz region, was very small; but a considerable capital is now being invested in establishing coke ovens, and, favored by the heavy duty, the enterprise promises to be a lucrative one for those concerned in it.

The Market for Gas Securities.

As intimated in our last the city gas share market has reached a point where extreme inactivity characterizes the situation. Towards the close of July Consolidated is reported to have declined to 74⅞ on an actual sale, but we incline to the idea that although a contract was professedly made at that figure, no shares parted hands. We think so because an order immediately given to purchase 200 shares at 75½ failed to elicit an offering. Undoubtedly some timid owners have parted with their stock at a price below 79, the reason given being that the completion of the works of the Standard Gas Light Company would precipitate a war of rates. It is quite likely that such a conflict may in time be precipitated, but it should be remembered that the latest gas creation of the Legislature, despite the fact that it was born amid the throes of those who were wildly engaged in an attempt to bring the Consolidated Gas Light Company to terms, is in the field to make money, and not to lose it. After war comes peace, so do not let the warriors rob you of a cent's worth of your property. By-the-way, we note that 5 shares Standard Gas Light Company's stock (full paid common, trust company's receipt) was recently sold at auction at 50½, and it was dear at that. Mutual is very weak, while Equitable fairly holds its own. Brooklyn shares are sluggish; in fact a transfer in them is a rarity. Eastern shares are all firmly held. The rumors regarding a Boston Gas Trust, presumably on the style of the Chicago example, are rife. Old Boston stock is held now in the market at about 204, and it is quite likely to go higher. Baltimore gas matters are very much entangled. We note that Robt. Garret was elected a director in the Consolidated Company of that city, at its recent annual meeting. Recent sales at auction included the following Brooklyn shares: 61 Nassau at 100½; 116 Brooklyn, at 101½; $1,800 Nassau scrip, at 95; 1 Metropolitan, at 86; 41 Citizens, at 58. Also $29,000 Somerville and Raritan (N. J.) Gas Company's 6 per cent. bonds, at 41⅜.

Gas Stocks.

Quotations by Geo. W. Close, Broker and Dealer in Gas Stocks,
16 WALL ST., NEW YORK CITY.
AUGUST 2.

☞ All communications will receive particular attention.
☞ The following quotations are based on the par value of $100 per share.

	Capital.	Par.	Bid	Asked
Consolidated	$35,430,000	100	73½	—
Central	440,000	50	30	—
" Scrip	220,000	—	47	57
Equitable	2,000,000	100	120	125
" Bonds	1,000,000	—	113	115
Harlem, Bonds	170,000	—	—	—
Metropolitan, Bonds	658,000	—	110	113
Mutual	3,500,000	100	93	96
" Bonds	1,500,000	1000	101	—
Municipal, Bonds	750,000		—	—
Northern	125,000	50	30	—
" Scrip	108,000			
Yonkers		50	—	80
Richmond Co., S. I.	300,000	50	50	—
" / Bonds	12,000	—	—	—
Gas Co's of Brooklyn.				
Brooklyn	2,000,000	25	101	102
Citizens	1,200,000	20	58	—
" S. F. Bonds	320,000	1000	—	103
Fulton Municipal	3,000,000	100	138	140
" Bonds	300,000		—	106
Peoples	1,000,000	10	61	62½
" Bonds (5's)	368,000	—	97	—
" " (6's)	94,000	—	100	—
Metropolitan	1,000,000	100	82	84
Nassau	1,000,000	25	101	103
" Ctfs	700,000	1000	100	—
Williamsburgh	1,000,000	50	125	128
" Bonds	1,000,000	—	111	—
Out of Town Gas Companies.				
Boston (Mass.) Gas Co.	2,500,000	500	204	208
Buffalo Mutual, N. Y.	750,000	100	90	95
" Bonds	200,000	1000	95	100
Citizens, Newark	1,000,000	50	140	145
" " Bonds.	45,000	—	—	—
Chicago Gas Trust	25,000,000	100	55½	58
Cincinnati G. & C. Co.	6,000,000	100	187	188
Consolidated, Balt.	6,000,000	100	52⅛	52⅞
" Bonds	3,600,000		107	107½
Chesapeake, Balt.	1,500,000	100	75	—
"	1,000,000		100	102
Consumers Toronto	1,000,000	50	192	—
Central, S. F., Cal.			80	100
Capital, Sacramento, Cal.			57½	60
Hartford, Conn.	750,000	25	140	142
Jersey City	750,000	20	168	—
Laclede, St. Louis, Mo.	2,000,000	100	125	—
Louisville, Ky.	2,570,000	50	130	132
Little Falls, N. Y.	50,000	100	95	100
" Bonds	25,000	—	100	103
Montreal, Canada	2,000,000	100	220	221
New Haven, Conn.		25	193	197